CHEMONICS INTERNATIONAL INC.

PERU: PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

Special Objective Grant Agreement
between the
Republic of Peru and the United States of America

for the

SUSTAINED REDUCTION OF ILLICIT COCA CROPS THROUGH ALTERNATIVE DEVELOPMENT IN TARGET AREAS OF PERU

USAID Contract No.: OUT-PCE-I-815-99-00003-00

Submitted to
USAID/Peru

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ACRONYMS

Categorical Exclusión (Exclusión Categórica)	IEE
Initial Environmental Examination (Declaración de Impacto Ambiental)	DIA
Environmental Assessment (Estudio de Impacto Ambiental)	EIA
National Commission for Development and Life without Drugs	DEVIDA
United States Agency for International Development	USAID
Office of Alternative Development of USAID	OAD
Office of Environment of USAID	ENV
National Council for the Environment	CONAM
Central Environmental Unit	CEU
Regional Environmental Unit	REU
Expanded Alternative Development Program	Expanded ADP
Principal Contractor	PC
DEVIDA Office for Environmental Conservation and Recuperation of Degraded Ecosystems	GMA

EXECUTIVE SUMMARY

Purpose of the Programmatic Environmental Assessment

The Expanded Alternative Development Project will finance activities in biologically diverse tropical forest areas of the eastern Andes foothills. The overall purpose of this Programmatic Environmental Assessment is to identify means by which the Expanded Alternative Development Program can identify and then avoid or adequately mitigate the negative environmental impacts of its activities on this environment. The PEA builds on the work, experience and procedures developed to date under the first phase of the ADP, with the purposes of conforming to the requirements of USAID environmental regulations (a) to collect and analyze baseline information, and (b) to ensure that environmental mitigation measures and activity selection criteria are integrated into the implementation of the Expanded ADP activities.

The Expanded Alternative Development Program

On September 12, 2002, the Governments of the United States and Peru signed a Special Objective Grant Agreement entitled the "Sustained Reduction of Illicit Coca Crops through Alternative Development in Target Areas of Peru." The agreement provides for USAID/Peru and the Peruvian anti-narcotics agency, DEVIDA, to jointly design, plan, supervise, and implement, between 2003 and 2007, the Expanded Alternative Development Program (Expanded ADP). USAID will finance the Expanded ADP with up to US$320 million. The Expanded ADP will provide market opportunities for licit products and improved education, health, sanitation and security to coca growing communities that formally commit themselves to voluntary eradication of their coca. It has four Intermediate Results: (1) Increased household income from sustainable licit economic activities, (2) Improved social conditions, (3) Natural resources managed in a sustainable manner and (4)Improved policy and institutional framework

Environmental Threshold Decision for the Expanded Alternative Development Activity

On July 16, 2002, the Latin America and Caribbean Bureau Environmental Officer (LAC/BEO) issued Environmental Threshold Decision LAC-IEE-02-36 for the Expanded Alternative Development Program. It made the following determinations:

Categorical Exclusion: Financial Services, Communications Strategy, Strengthened Institutional and Policy Framework Components and the technical assistance and training activities under the Strengthened Local Organizations Component.

Negative Determination: Protected Areas and Forest Management Plans Components and for the small-scale public works activities under the Strengthened Local Organizations and Rapid Response Components. The Threshold Decision required, however, that applicable U.S. and Peruvian Government environmental regulations, restrictions, and guidelines guide these activities. The Threshold Decision required that the protected area and forest management plans include an environmental assessment of their potential environmental impacts and that the Terms

of Reference for their preparation be submitted to LAC/BEO for approval prior to initiating activities.

Positive Determination: Economic Infrastructure, Agriculture Extension and Information Services and "Roads for Markets" activities.

Summary of Potential Negative Environmental Impacts and Mitigation Measures

The PEA identifies increased destruction and fragmentation of highly biologically diverse tropical forests as a result of improvements to road infrastructure in forested areas as the principal potential significant negative environmental impact of the Expanded ADP. Similar road improvements under the previous Alternative Development Project stimulated increased deforestation by agricultural colonists without providing for effective mitigation measures. Consequently, the Programmatic Environmental Assessment recommends that the Expanded ADP link its road improvement activities closely to support for the establishment and management of adjacent natural forest management units. These forest management units should be so structured as to provide maximum benefits to existing local populations and should be managed according to internationally accepted standards for management of tropical forests.

The potential negative environmental impacts of the Expanded ADP small-scale infrastructure, agricultural extension, protected area management, and forestry concession components can generally be avoided or mitigated through standard professional practices. However, to ensure that these standard professional practices are applied in the hundreds of construction projects that the Expanded ADP will finance, a system should be established for timely, professional environmental review of each project.

Larger scale construction projects, such as long roads through forested areas or major bridges generally will require an Environmental Assessment, prepared according to the procedures required by USAID Environmental Regulations.

Recommendations for the Effective Functioning of the Expanded Alternative Development Environmental Process

The PEA identifies weak points in the environmental review and mitigation process that the previous Alternative Development Program utilized from 1995 through 2002. On this basis, the PEA makes the following fifteen recommendations for effective environmental review and mitigation under the Expanded ADP:

(1) Provide an adequate budget for the identification and assessment of environmental impacts and follow-up on environmental mitigation measures.

(2) Include adequate financing in project budgets to permit timely implementation of environmental mitigation measures.

(3) Utilize contracting procedures that ensure adequate funds for implementation of environmental mitigation measures for infrastructure projects.

(4) Establish direct lines of administrative and technical supervision between the Central Environmental Unit and the Regional Environmental Units.

(5) Ensure consistent, effective follow-up on the mitigation measures for significant negative environmental impacts through the contracting, training and retention of experienced, trained environmental professionals.

(6) All the institutional actors of the Expanded ADP must comply with the procedures and requisites indicated on this report.

(7) Include legal obligations for environmental assessment, mitigation and monitoring in each contract or sub-agreement financed with Expanded Alternative Development Program funds.

(8) Utilize a methodology that identifies, evaluates and mitigates indirect negative impacts.

(9) Include environmental considerations in each step in the project selection and implementation process.

(10) Utilize a methodology that provides for public participation in the process for environmental impact identification and mitigation.

(11) Establish an environmental impact methodology that clearly separates significant from non-significant environmental issues.

(12) In close collaboration with the farmers who have voluntarily eradicated their coca, reforest farms with sites degraded by coca production.

(13) Establish a process for continual improvement in the effectiveness of the environmental review and mitigation process.

(14) Focus the Environmental Process on identification and compliance with Environmental Conditions and Environmental Mitigation Measures.

(15) Evaluate and mitigate the potential negative environmental impacts of the projects that the Expanded ADP has already undertaken during 2003.

An Environmental Process for the Expanded Alternative Development Program

Based on the previous fourteen requirements the PEA describes an Environmental Process for the Expanded Alternative Development Program, with the following Sub Processes:

Sub Process 1: Negotiation. Coca growing communities accept and understand environmental commitments as part of projects.

Sub Process 2: Reforestation. Degraded sites on former coca farms restored through reforestation.

Sub Process 3: Technical Proposals. Project technical proposals include environmental considerations.

Sub Process 4: Preparation of Initial Environmental Assessments. Project IEAs assign projects classification of (a) Categorical Exclusion; (b) Negative Determination without Conditions; (c) Negative Determination with Environmental Conditions; (d) Positive Determination.

Sub Process 5: Terms of Reference for Environmental Assessment. Terms of Reference for Environmental Assessments of projects with a Positive Determination prepared according to USAID Environmental Regulations.

Sub Process 6: Environmental Assessments. EAs for projects with a Positive Determination prepared according to USAID Environmental Regulations.

Sub Process 7: Pesticides. Procedures established in a separate Pesticide Environmental Assessment applied to projects financing or promoting the use of pesticides.

Sub Process 8: Natural Forest Management Projects. An independent forest management certification entity evaluates compliance with technical standards.

Sub Process 9: Road Projects. For projects that involving road improvements in forested areas implementation of forest management for the benefit of existing populations.

Sub Process 10: Follow up. Compliance with mitigation measures for projects through systematic, professional, timely field inspections.

Sub Process 11: Quality control. A central environmental unit monitors quality of entire environmental process.

Sub Process 12: Environmental Data Base. Data on compliance with mitigation measures stored for analysis of environmental process effectiveness.

Sub Process 13: Reports. Reports on environmental process sent to USAID and Peruvian sector institutions.

Institutional Structure and Professional Staffing for the Environmental Process

The PEA recommends that the Environmental Process involve DEVIDA's Division of Environmental Conservation and Recuperation of Degraded Areas (GMA), a Central Environment Unit (CEU) and a Regional Environmental Unit (REU), both under the administrative and technical control of the Principal Contractor, and the Expanded ADP's existing Monitoring and Evaluation Unit (MEU). The GMA will provide overall coordination of the Environmental Process, especially in relation to its compliance with Peruvian environmental regulations, and maintain the Expanded ADP's Environmental Data Base. The CEU will administer the environmental assessment and inspection process. The REU will make field inspections of Expanded ADP's projects. The MEU will provide the Environmental Process with supplemental, part-time professional expertise, especially during the peak construction season.

The PEA recommends that the Expanded ADP finance a total of eight environmental professionals specifically for the Environmental Process. Of these two will work in the GMA, two in the CEU and four in the REU. Their professional background should be forestry and environmental engineering. Outside of the budget for the Environmental Process itself, the Expanded ADP will also finance the part-time work on the Environmental Process of the supplemental professionals assigned temporarily from the MEU.

Budget for the Expanded Alternative Development Environmental Process

The PEA calculates a budget for the operation of the Expanded ADP Environmental Process for five years to be US$6,697,416. This amount includes the estimated contribution of the Government of Perú to be around US$768,000.

SECTION I

1 Introduction

Section 1 first explains the purpose of this Programmatic Environmental Assessment (PEA). Then it describes the background and content of the Expanded Alternative Development Project (Expanded ADP). Next it summarizes the USAID and Peruvian USAID and Peruvian legal requirements for environmental impact assessment and mitigation. Fourth, the chapter describes institutional and contractual mechanisms through which the Expanded ADP will be implemented. Finally, it discusses the PEA's methodology and mentions the factors that limited its scope and level of detail.

1.1 Purpose of the Programmatic Environmental Assessment

The Expanded Alternative Development Project will finance activities in the heavily forested and biologically diverse tropical areas in the foothills of the eastern Peruvian Andes. The overall purpose of this Programmatic Environmental Assessment is to identify means by which the Expanded Alternative Development Program can identify and then avoid or adequately mitigate the negative environmental impacts of its activities on this environment. The PEA builds on the work, experience and procedures developed to date under the first phase of the ADP, with the purposes of conforming to the requirements of USAID environmental regulations (a) to collect and analyze baseline information, and (b) to ensure that environmental mitigation measures and activity selection criteria are integrated into the implementation of the Expanded ADP activities.

1.2 Background and Content of the Expanded Alternative Development Program[1]

The eradication of coca is a joint vital interest of the United States and Peru. In 1993, Peru provided 80 percent of the coca leaves used in making the cocaine consumed in the United States. Coca leaf and cocaine production in Peru have promoted anarchy, impeded democracy, and undermined licit economic activities.

In 1991 Peru and the United States signed the "Agreement Regarding the Policy for the Control of Drugs and Alternative Development," laying the basis for future cooperation. Based on this agreement, from 1995 to 2002, Peru and the United States jointly financed and implemented the Alternative Development Program (ADP). The ADP promoted general economic development in the coca growing areas by promoting licit economic opportunities for coca leaf producers and through the construction of social and economic infrastructure. Together with drug interdiction, the ADP contributed to a decrease in area of coca in Peru between 1998 and 2001 from 54,000 to 32,000 ha.

[1] Summarized from the Terms of Reference for the PEA.

The area of coca has increased since 2001, however, and now Peru over 36,000 ha of coca. Consequently, as part of the Andean Regional Initiative, on September 12, 2002 the Governments of the United States and Peru signed a Special Objective Grant Agreement entitled "Sustained Reduction of Illicit Coca Crops through Alternative Development in Target Areas of Peru." Under this agreement, USAID/Peru will receive up to US$320 million over the five-year period from 2002 to 2007 for the Expanded Alternative Development Program (Expanded ADP).

USAID/Peru and the Peruvian anti-narcotics institution, the National Commission for Development and Life without Drugs (DEVIDA) will jointly design, plan, supervise, and implement the Expanded ADP. Like the previous Alternative Development Program, the Expanded ADP aims to establish the conditions for farmers to abandon illicit coca cultivation by creating licit market opportunities and by providing rural people in coca growing areas with improved education, health, sanitation and security services. The Expanded ADP, however, will target most of its assistance directly to communities in which all coca growers formally agree to carry out voluntary coca eradication.

The Expanded ADP is intended to achieve the following four Intermediate Results.

Intermediate Result 1: Increased household income from sustainable licit economic activities

In communities that agree to voluntarily eradicate their coca, the Expanded ADP will provide technical and financial support for activities that will increase the household income from sustainable licit economic activities. These activities include support for private sector investment that will strengthen production and marketing of licit products, institutional strengthening, and market studies as well as the construction and improvement of tertiary, secondary and primary roads.

Intermediate Result 2: Improved social conditions

In communities that agree to voluntarily eradicate their coca, the Expanded ADP will finance improvements in social conditions. Such improvements will include the construction of infrastructure, such as schools, health centers, sanitation and potable water systems. The Expanded ADP will develop the capacity of local public institutions to provide basic services within their jurisdiction. Community level agreements will provide for broad, local participation in the planning and maintenance of social infrastructure. Since in the short term, coca eradication may reduce family income, the Expanded ADP will provide emergency relief, through mother-child health programs and labor-intensive public works, to communities that have voluntarily eradicated coca.

Intermediate Result 3: Natural resources managed in a sustainable manner

The Expanded ADP will promote the sustainable use of natural resources for the purpose of developing alternative, licit sources of income and employment. Within the framework of Peru's forestry laws, as well as other national and international regulations, management plans will be developed to allow people in target areas to protect and use their community's natural resources. The Expanded ADP will also promote sound environmental practices by identifying, avoiding,

mitigating and monitoring the negative environmental impacts of its activities. In order to provide temporary employment, the Expanded ADP may finance the rehabilitation of degraded ecosystems. Under this component, the USAID/Peru Alternative Development Office will provide funds from the Alternative Development Program to its Environment Office for the implementation of a Joint Environmental Agenda.

Intermediate Result 4: Improved policy and institutional framework

The Expanded ADP will support efforts to improve the local and national policy and institutional framework in support of a licit economy. To do so, it will finance the development of policies, regulations, and institutions to promote broader public participation in local decision-making and community development, strengthened local organizations, and improved health, education, and security services.

1.3 Environmental Regulations Governing the Expanded Alternative Development Program

Peruvian Environmental Regulations

Peruvian Public Law 27446 establishes the National System for Evaluation of Environmental Impact (Ley del Sistema Nacional de Evaluación del Impacto Ambiental). Article 4 of Public Law 27446 refers to a list of categories of projects that require environmental screening. This list, however, does not yet exist, since the law's regulations have not been approved. Those projects that fall in the category of projects judged to have the potential to cause an environmental impact must be screened. The screening document is the "Cribado Ambiental," which classifies projects into Category I, II and III. Category I Projects have a low risk of causing an environmental impact and are required to prepare only a "Declaration of Environmental Impact." Category II projects present a medium-to-moderate risk of environmental impact and must prepare a Semi-Detailed Environmental Impact Study. Category III projects present a high risk of environmental impact and are required to prepare a Detailed Environmental Impact Study.

Although the National Environmental Council (CONAM) defines environmental policy and coordinates the environmental review process, each sector ministry retains responsibility for licensing and supervising environmental compliance in its sector. The ministries, therefore, have responsibility for approving project classifications, Terms of Reference for Environmental Impact Studies, and the Environmental Impact Studies. In fact, due to the lack of regulations and financing, not all the sector ministries are fully implementing Public Law 22746.

USAID Environmental Regulations

USAID Environmental Regulations are contained in the Foreign Assistance Act Regulation 216. These are Federal Regulations that USAID is required by law to follow. The regulations have the overall intention of integrating environmental factors and values into the USAID decision-making process. They require that an Initial Environmental Examination (IEE) be submitted for all proposed activities to the Bureau Environmental Officer (BEO) that recommends the BEO a

classification of the activity into one of three categories: (1) Categorical Exclusion; (2) Negative Determination without Conditions; (3) Negative Determination with Conditions, or (4) Positive Determination. The BEO then makes an Environmental Threshold Determination, which accepts or changes the IEE's recommendations. Regulation 216 provides a list of categories of activities to which the Categorical Exclusion applies and a list of activities for which an Environmental Assessment must generally be prepared.[2] Regulation 216 requires an Environmental Assessment to analyze the environmental consequences of the proposed action and propose means to mitigate adverse environmental impacts.

When USAID co-finances activities with other donors the following conditions apply:

- If USAID is a "minor donor" in the project, contributing both less than $1,000,000 and less than 25 percent of the estimated project cost, and with no control over planning or design, USAID has no control over the use or non-use of environmental review procedures;
- If USAID contributes more than $1,000,000 but this is less than 25 percent of the estimated project budget, the Mission Environmental Officer must determine whether the environmental review procedures used by the partner organization for the project in question are adequate;
- If USAID is involved in planning and design and/or contributes over 25 percent of the estimated budget for a project, USAID Guidelines must be followed or the Guidelines of the partner must, in the judgment of the Mission Environmental Officer be implemented to the same standard as the USAID guidelines.

Environmental Threshold Decision for the Expanded Alternative Development Program

On July 16, 2002, based on an Initial Environmental Examination (IEE) submitted by USAID/Peru, the Latin America and Caribbean Bureau Environmental Officer (LAC/BEO) issued Environmental Threshold Decision LAC-IEE-02-36 for the Expanded Alternative Development Program. The Environmental Threshold Decision assigned the following classifications to the activities to be implemented under the Expanded Alternative Development Program.

Categorical Exclusion: Financial Services, Communications Strategy, Strengthened Institutional and Policy Framework Components and the technical assistance and training activities under the Strengthened Local Organizations Component.

[2] Regulation 216 requires an Environmental Assessment for the following types of projects: potable water or sewerage projects. river basin development, irrigation or water management, agricultural land leveling, drainage projects, large-scale agricultural mechanization, new lands development, resettlement, penetration road building or road improvement, power plants, industrial plants. USAID environmental regulations also require a site-specific Environmental Assessment when: Activities involve landslide mitigation involving earthmoving or construction of physical works; the existing construction project or activity develops additional or substantially modified sub-activities, which were not considered in the IEE and/or the environmental assessment checklist and the MEO identifies a potentially significant negative environmental impact(s); the mitigation measures established in the environmental guidelines are not achievable or have been shown, through the monitoring plan, to be insufficient to prevent a significant environmental impact; the activity or project appears to present a potentially substantial adverse environmental effect but requires more analysis to make a definite conclusion. If these conditions come to apply during the implementation of an activity, an amended IEE detailing the need for a site-specific EA must be submitted to the LAC/BEO, a Threshold Decision issued and its requirements complied with, before the proposed action can begin.

Negative Determination: Protected Areas and Forest Management Plans Components and the for the small-scale public works activities under the Strengthened Local Organizations and Rapid Response Components. The Threshold Decision required, however, that applicable U.S. and Peruvian Government environmental regulations, restrictions, and guidelines guide these activities. The Threshold Decision required that the protected area and forest management plans include an environmental assessment of their potential environmental impacts and that the Terms of Reference for their preparation be submitted to LAC/BEO for approval prior to initiating activities.

Positive Determination: Economic Infrastructure, Agriculture Extension and Information Services and "Roads for Markets" activities.

Terms of Reference for the Programmatic Environmental Assessment

The Threshold Decision required the preparation of a Programmatic Environmental Assessment (PEA) for the Expanded ADP and a separate Environmental Assessment of the direct impacts of the "Roads for Markets Initiative."[3] A separate Environmental Assessment has been prepared for the "Roads to Markets Initiative." USAID/Peru prepared and the Bureau Environmental Officer approved the Terms of Reference for this Programmatic Environmental Assessment. Consequently, the Programmatic Environmental Assessment must comply with the approved Terms of Reference.

1.4 Institutions Involved in Implementation of the Expanded Alternative Development Program

The Expanded ADP's implementation mechanisms are diverse, involving a number of institutions. These implementation mechanisms and institutions may change as necessary to achieve the desired program result of eradication of illicit coca cultivation. As of mid-2003, USAID and the GOP were planning to utilize the following mechanisms and institutions to implement the Expanded ADP.

Office of Alternative Development, USAID/Peru

The Office of Alternative Development of USAID/Peru has overall responsibility for the administration of the funds committed to the Special Objective Grant Agreement "Sustained Reduction of Illicit Coca Crops through Alternative Development in Target Areas of Peru."

National Commission for Development and Life without Drugs (DEVIDA)

DEVIDA is the USAID Peruvian counterpart institution. DEVIDA does not directly implement field activities but plays a policy, coordinating, monitoring, and follow-up role. DEVIDA's Alternative Development Division (Gerencia de Desarrollo Alternativo) will coordinate coca eradication policies, negotiate with coca growing communities, and monitor overall progress through periodic surveys. Its Environmental Conservation and Recuperation of Degraded

[3] This separate Environmental Assessment for the "Roads to Markets Initiative" was presented to the Mission Environmental Officer on June 2, 2003. It covers both the direct and indirect impacts of this component of the Expanded ADP.

Ecosystems Division (Gerencia de Conservación de Medio Ambiente y Recuperación de Ecosistemas Degradados, Gerencia Medio Ambiental or GMA), has responsibility for ensuring DEVIDA compliance with Peruvian Environmental Regulations and for undertaking actions to recuperate ecosystems that have been degraded by coca cultivation.

Principal Contractor

A United States consulting firm, contracted directly by USAID/Peru through a competitive process, will have responsibility for negotiating and implementing agreements with coca growing rural communities that exchange technical assistance and infrastructure projects for coca eradication. The Principal Contractor will carry out natural forest management activities. It has responsibility for oversight of the Expanded ADPs environmental review and mitigation process.

The United States Army Corps of Engineers

The United States Army Corps of Engineers (USACE), through an inter-agency agreement with USAID/Peru, will have responsibility for the rehabilitation of the Juanjui-Tocache section of the Fernando Belaunde Marginal Highway, including the implementation of the mitigation measures for negative direct and indirect environmental impacts that were identified in a separate Environmental Assessment, which has been approved by the Bureau Environmental Officer.

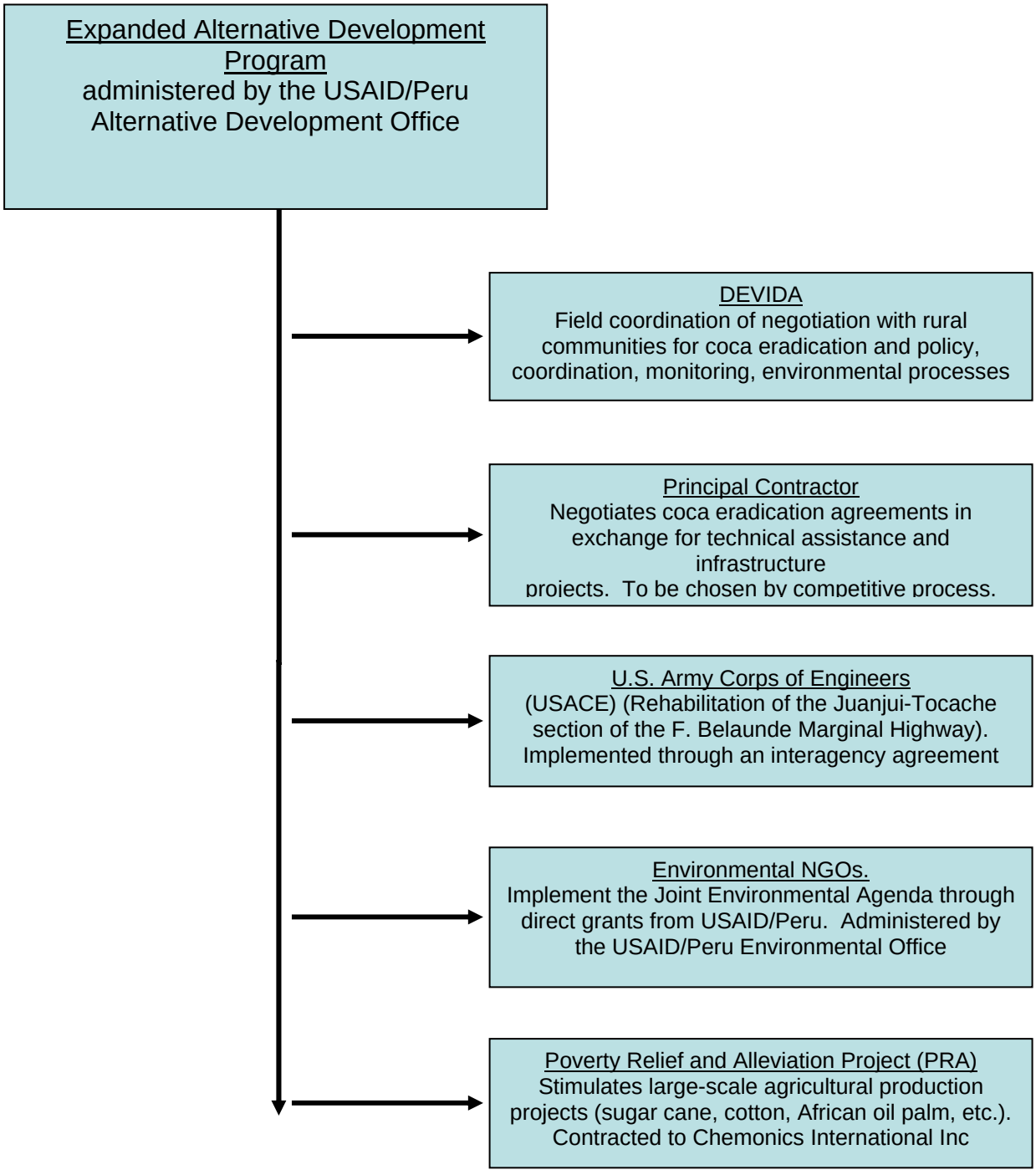
International Environmental Non-Governmental Organizations

International environmental non governmental organization, including the World Wildlife Fund (WWF), the Nature Conservancy (TNC), and the Chicago Field Museum, will receive direct grants from USAID/Peru. These institutions will implement a Joint Environmental Agenda, focused on national park management and natural forest management, generally working with or through Peruvian institutions.

Poverty Relief and Alleviation Project (PRA)

The Poverty Relief and Alleviation Project (PRA) will receive Expanded ADP funds in order to work in the coca growing areas. It will provide technical assistance to larger scale commercial activities such as natural forest management, oil palm, cotton, and sugar cane cultivation.

Figure 1.1. Expanded Alternative Development Program



1.5 Methodology

The methodology utilized to prepare the Programmatic Environmental Assessment was chosen in order to achieve two objectives. First, it was intended to ensure that the end-users of the PEA would understand, agree with, and find useful its recommendations. Second, it was intended to provide a sound basis for designing an environmental process for the Expanded ADP that would efficiently identify and effectively avoid or mitigate significant negative environmental impacts attributable to actions financed by Expanded ADP funds.

To achieve the first objective, the PEA Team adopted a "utilization evaluation" methodology. This methodology specifically seeks to make the evaluation useful to its end-users by involving them closely in the evaluation process. This methodology generally takes more time than less participatory evaluation methodologies. Yet it results in document recommendations or requirements have been understood and accepted by its end users and, therefore, can be implemented more easily and quickly than those of a document whose preparation has not closely involved its end-users.

To achieve the second objective, the PEA Team analyzed the experiences and results of the environmental review, mitigation and monitoring process that had been utilized under the previous Alternative Development Project from 1995 through 2002. Its conclusions and recommendations, therefore, are based on over seven years of empirical experience.

First, the PEA Team collected and analyzed information obtained in Lima from documents and interviews provided by USAID and DEVIDA. Because security restrictions prevented extensive travel, the PEA Team prepared two detailed case studies of the previous Alternative Development Project's environmental review process. These case studies examined the Humapaza-San Juan road improvement project in the municipality of Tres Unidos and the Saposoa Irrigation Project in the municipality of Huallaga, both in the Central Huallaga Valley. During a trip by road from Tarapoto in the Central Huallaga Valley to Tingo Maria in the Upper Huallaga Valley, a portion of the team members made observations of the Fernando Belaunde Marginal Highway, the adjacent forest, and schools and health centers that had been constructed under the Alternative Development Program. They also interviewed mayors, business leaders, and DEVIDA and NGO staff. Additionally, the forester on the team made field observations and interviews in Aguaytía regarding the forest concessions.

On the basis of their observations and interviews, each team member prepared a separate report. The Team Leader incorporated these reports into a first draft of the PEA, which was sent to USAID/Peru for comments. On the basis of these comments the Team Leader prepared a second draft of the PEA which USAID again reviewed. The Team Leader then worked with USAID/Peru, DEVIDA, and the Principal Contractor staff to respond to produce the final draft of the PEA.

1.6 Public Consultations

Public consultation during the preparation of the PEA took two forms. The first involved the 23 person days devoted to the preparation of the two case studies involving projects financed by the former Alternative Development Program in Tres Unidos and Saposoa. During that time, its members thoroughly discussed the environmental aspects of the ADP with local people and officials. During their trip by land from Tarapoto to Tingo Maria, the PEA Team discussed the PDA with local officials and representatives of agricultural and forest industry. Subsequently, in Lima, the PEA Team consulted extensively with representatives of the institutions that will be involved in the design and implementation of the Expanded PEA, such as USAID, DEVIDA, and the World Wildlife Fund. Annex B provides a list of the people the PEA Team consulted.

1.7 Limitations on the Preparation of the Programmatic Environmental Assessment

Insecurity during the time period available for field observations restricted the PEA Team's field observations to the Central Huallaga and Aguaytía Valleys. This restriction reduced the detail and scope of the PEA Team's review of the specific ecological, social and economic characteristics of the other valleys where the Expanded ADP will operate.

SECTION II

2 Description of the Affected Environment

Section 2 summarizes the principal characteristics of the environment in the geographic area of the Expanded ADP. First, it lists the contents of the CD that accompanies the PEA. Then it defines the geographic region within which the Expanded ADP will operate. Finally, the chapter summarizes selected environmental baseline information for the Expanded ADP areas and its general relevance to the identification and mitigation of negative environmental impacts from Expanded ADP actions.

2.1 Geographic Information System Baseline Information

The CD that accompanies the PEA contains most of the baseline environmental information for the Expanded ADP area.[1] Using the Geoprocessing Wizard of ArcView, this data can be manipulated for analytical purposes related to environmental assessment and monitoring.

The database contains the following information:

- Geographic Limits of the Expanded ADP
- Area of Production Forests
- Forest Concessions
- Protected Areas
- Buffer Zones of Protected Areas
- Indigenous Territories
- Former Areas of Coca Cultivation
- Priority Conservation Zones
- Deforested Areas
- Areas most Threatened by Deforestation
- Roads
- Topographic Isotope Lines
- Hydrographic System
- Population Centers
- Municipality, Provincial and Departmental Boundary Lines
- TIN or Model 3d
- Land Use Capacity
- Vegetative Cover and Land Use
- Ecological Life Zones

[1] The sources of this baseline data include: USAID, DEVIDA, INRENA, INEI, CDC U/La Molina, the Ministry of Transportation and Communication, CADA, WWF, CIDEF, Proyecto ZEE, AMRESAN, PETT, and the Special Development Projects.

The maps at the end of this chapter indicate the location of the areas where the Expanded ADP will concentrate its field activities, the principal land uses, including the location of tropical forests and protected areas, and the road system.

2.2 Geographic Range of the Expanded Alternative Development Project

The Expanded ADP's geographic area encompasses a total of 9,794,511 ha in the mountains above the Central Huallaga, Upper Huallaga, Aguaytía and Apurimac-Ene Valleys [2] The Special Objective Agreement (SOAG), however, leaves open the possibility that the Expanded ADP may provide funds to activities in areas outside of this geographic area. The SOAG says that the governments of Peru and the United States will:

> "…Continually analyze the most appropriate areas for intervention, focusing on those areas of Peru with the greatest concentration of coca production. Other interventions may be implemented within broader areas that include coca-growing communities and contiguous population centers and economic/environmental corridors. The criteria for choosing the sites of specific intervention areas include…high potential for economic impact, recent coca eradication, areas that have significant direct economic or social links with priority focus areas, and areas that could begin to produce coca."

If the Expanded ADP were to undertake activities outside of the presently defined geographic area, then it would be necessary to determine if this Programmatic Environmental Assessment would require an amendment to take into account new environmental or social circumstances.

2.3 Summary of Environmental Characteristics of the Expanded ADP Geographic Area

Topography and Rivers

The Huallaga River flows from south to north and is bordered by high mountains to the west and lower ones to the east. The Apurimac River also flows from south to north between high mountains. The Aguaytía River, by contrast, flows from west to east through lowlands. The width of these valleys varies considerably. The Huallaga River, for example, has formed a wide valley between Tingo María and Tocache. From Tocache to Picota its valley narrows. At Picota the Huallaga Valley opens up again and becomes wide and flat. To the north of Tarapoto the river flows through a narrow gorge before widening out on the Amazon plain. The Aguaytía River, by contrast, flows almost entirely through Amazon lowlands while the Apurimac River flows through a much narrower valley without large, flat valley bottoms. The valleys include low and high terraces that are periodically flooded.

[2] The maps in the CD that accompanies this PEA indicate the geographic area for the Expanded ADP activities as delimited by USAID/Peru.

Climate

Rainfall is generally very high in the geographic areas included in the Expanded ADP. Average annual precipitation varies from 1,000 mm in the valley bottoms to more than 3,500 mm at higher elevations. In the valley bottoms there are marked dry seasons during the months of June through September. At higher elevations dry seasons become less distinct. Average annual temperatures in the valley bottoms average around 25 C and decrease at higher elevations.

Land Use and Agricultural Production Areas

The Expanded ADP, as indicated in Table 2.1, will operate within an area of approximately 9,794,509 ha. Forest covers about 7,191,983 ha or 73 percent of the area. Non-forest land uses cover about 2,596,806 ha, or 27 percent of the area. Forest originally covered almost the whole area.

Table 2.1. Total area and percentage of area in forest, non/forest and agriculture/pasture in the ADP Valleys

ADP Valley	Total Area		Forest		Agriculture/ Pasture/Unused	
	Ha	% Total	Ha	% Valley	Ha	% Valley
Aguaytía	1,540,232	16	1,127,937	73	409,315	27
Central Huallaga	4,929,831	50	3,522,511	71	1,407,119	29
Upper Huallaga	2,401,671	25	1,792,447	75	606,693	25
Apurimac-Ene	922,775	9	748,088	81	173,679	19
TOTAL	**9,794,509**	**100**	**7,190,983**	**73**	**2,596,806**	**27**

Source: I.Martínez, PEA Team

Bandy (2002) makes a division of the soils within the Expanded ADP area into valley bottoms, intermediate slopes, and high elevations. In the valley bottoms, generally below 500 meters above sea level, alluvial soils predominate. On these soils rice, soybeans, sugar cane, beans, pasture, and cotton generally grow well. With irrigation, two or even three crops can be harvested each year. Only patches of the original natural forest remain in most of the valley bottoms, usually on the steepest slopes, adjacent to water bodies or at a considerable distance from roads.

On intermediate slopes, at altitudes from 500 to 2,200 meters above sea level, soils tend to be deep, yellow or red, with good drainage and a wide range of acidity and fertility levels. The variability of soil chemical and physical characteristics makes agriculture more difficult than in the valley bottoms. Farmers rely on slash and burn techniques to maintain soil fertility and control agricultural pests. The most widespread crops are hard corn, beans, upland rice, bananas, coffee, cacao, peppers and lemon grass. Permanent rather than shifting agriculture would require that eight or more different crops and leguminous trees be grown together. These soils are susceptible to rapid erosion and loss of fertility. In the Central Huallaga Valley, for example, there are over 2 million ha of degraded, abandoned soils. Many of these soils could, however, be made productive again though the addition of rock phosphate and organic material.

At altitudes above 2,200 meters above sea level the soils are generally superficial because they occur on very steep slopes. These soils are generally unsuitable for agricultural production.

Coca Cultivation

Table 2.2 indicates the number of hectares in coca in the main Peruvian production areas between 1998 and 2002. Within the Expanded ADP geographic area coca production covers something over 34,000 ha. Coca generally is cultivated on sloped sites because their better drainage reduces problems with diseases.

Table 2.2. Net coca cultivation in Peru by region, 1998-2002

Hectares	**1998**	**1999**	**2000**	**2001**	**2002**
Upper Huallaga	21,000	15,200	12,200	13,700	14,700
Apurimac	9.000	8,100	7,500	8,500	10,000
Cusco	7,500	7,500	7,400	7,400	7,400
Aguaytía	6,100	1,900	2,200	1,000	1,100
Central Huallaga	2,100	2000	1,900	1,000	1,000
Other	5,300	4,000	3,000	2,400	2,400
Total	**51,000**	**38,700**	**34,200**	**34,000**	**36,600**

Source: Narcotics Affairs Section, United States Embassy, Peru

Protected Areas

Nine officially declared national protected areas, totaling over 3 million ha, occur within the geographic area of the Expanded ADP. All of them contain important reserves of genetic, species, and ecosystem diversity. Table 2.3 indicates their name, area and most outstanding characteristics.

Table 2.3. Name, size in hectares and outstanding characteristics within the ADP area

Protected Area	Area (Ha)	Outstanding Characteristics
Otishi National Park	305,973	Protects watersheds in Cordillera de Vilcabamba
Machigueng and Ashaninca Communal Reserves	218,905	Parijaro y Hectariato waterfalls; largest natural bridge in the world (Pavirantsi).
Río Abiseo National Park	274,520	Northeast montane forest; Natural Patrimony of Humanity
El Sira Communal Reserve	616,413	Ethnic reserve for subsistence activities
Yanesha Communal Reserve	34,745	Ethnic reserve with high biological diversity.
Tingo María National Park	4,778	*Bella Durmiente* mountain and C*ueva de las Lechuzas*.
Yanachaga Chemillen National Park	122,000	Pleistocene refuge important for evolutionary history
Alto Mayo Protection Forest	182,000	Protects water supply for Alto Mayo Valley
Cordillera Azul National Park	1,200,000	Habitat diversity due to range of elevations

These protected areas generally lack adequate staff, budget, equipment, marked boundaries and management plans to make their effective protection and management possible.

Biological Diversity

The National Study of Biodiversity indicates that the geographic area of the Expanded ADP contains Peru's widest range and greatest concentration of internationally important biological diversity at the ecosystem, species and genetic levels. The geographic area includes large area of the "ceja de selva," between 800 and 1,000 masl, the "selva alta," between 400 and 800 masl, and the "selva baja," below 400 masl tropical forest ecosystems. Within these broad classifications, many ecosystem variations exist, as a function of elevation, soils, exposure, slope and other factors. Different types of terraces in the region's valley bottoms, for example, contain different flora and floral species composition changes with only small increments of elevation. The National Study of Biodiversity, for instance, lists 28 life zones for the "Inca Region," which includes the Apurimac Valley. It lists 18 life zones for the Department of San Martin, which includes much of the Central Huallaga and 10 life zones for the Department of Ucayali, which includes the Aguaytía Valley. In the Upper Huallaga Valley it lists 15 life zones within the coca growing areas.

Approximately 7,372 species of plants occur in the Peruvian Amazon and most of these occur in the coca growing regions where the Expanded ADP will undertake activities. Floral species composition and diversity tend to vary with elevation. In the Von Humboldt forest in Aguaytía, at elevations below 500 masl, 187 tree species belonging to 43 families occur. In the seasonally dry forest around Tarapoto, in the Central Huallaga Valley, 102 species in 38 families have been recorded. Further south and at higher elevations, in the Abiseo River National Park, 1,040 species of plans were registered.

The species composition of the fauna in the Expanded ADP area reflects that of the Peruvian Amazon in general, which has 263 species of mammals, 806 species of birds, 180 species of reptiles, 262 species of amphibians, and 697 species of fish. Many species in some of these groups, however, probably remain to be discovered and identified. Less is known about the range of species in other groups of organisms, such as insects, bacteria, or fungi. They, however, like the more well-known groups of animals, are likely to be as diverse as any place on earth.

Immigration, Population and Settlement Areas

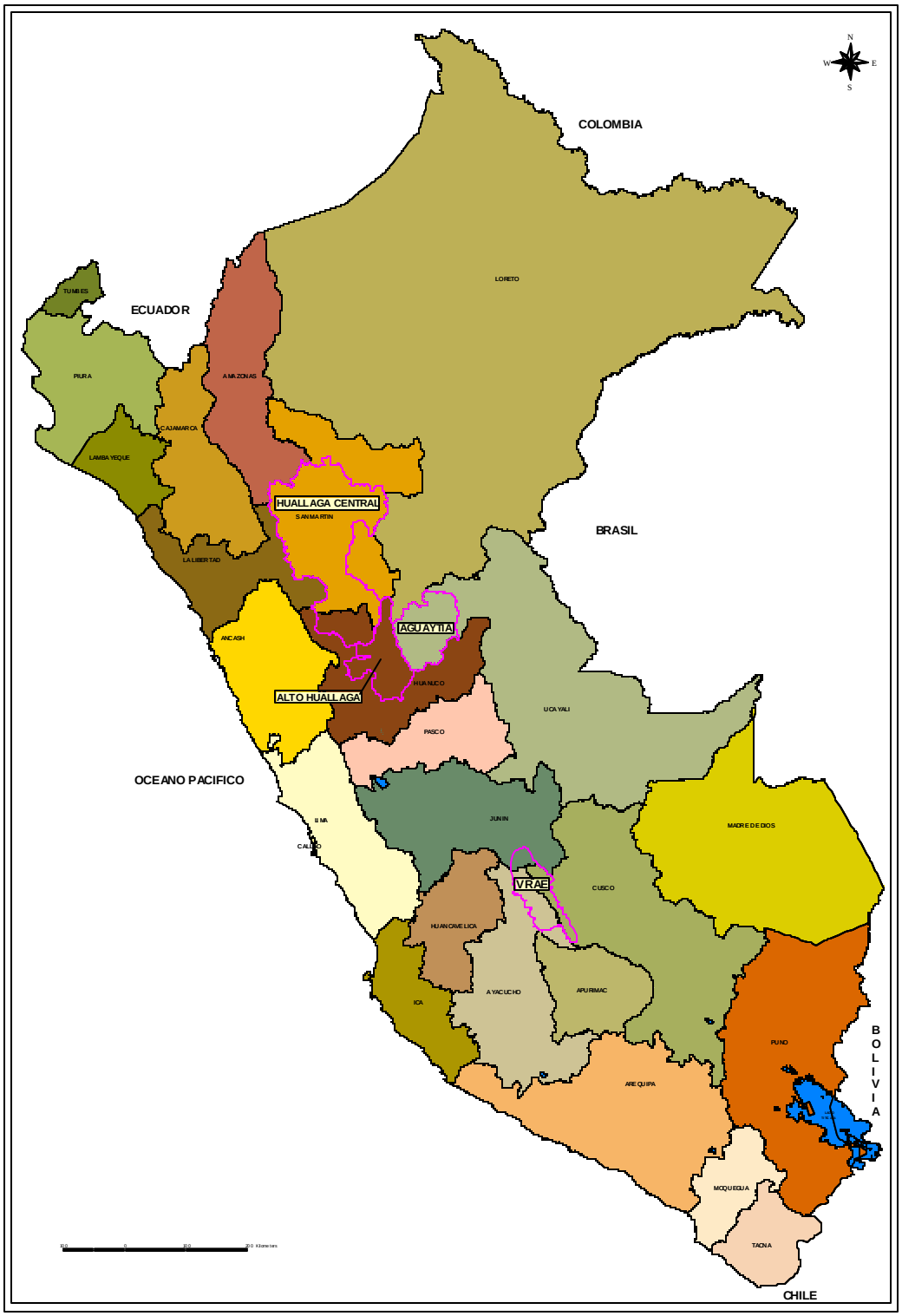
In the Expanded ADP areas, generally more than 80 percent of the adult population have emigrated out of adjacent highlands. Thus immigrants into the Central Huallaga come from the more western parts of the Department of San Martín and from Cajamarca; immigrants to the Upper Huallaga and Aguaytía come from the western parts of the Department of Huánuco; immigrants to the Apurimac Valley mostly come from the Department of Ayacucho. Each of these migrant groups not only brings its own habits and customs but often retains social and economic links to their areas of origin.

The rate of immigration into the geographic area of the Expanded ADP continues to be very high, stimulated by the "push factors," such as infertile land and unemployment in the highlands, and "pull factors," such as unpopulated forestland and employment in coca production. Land speculators, moreover, often promote and organize immigration. Most immigrants bring with

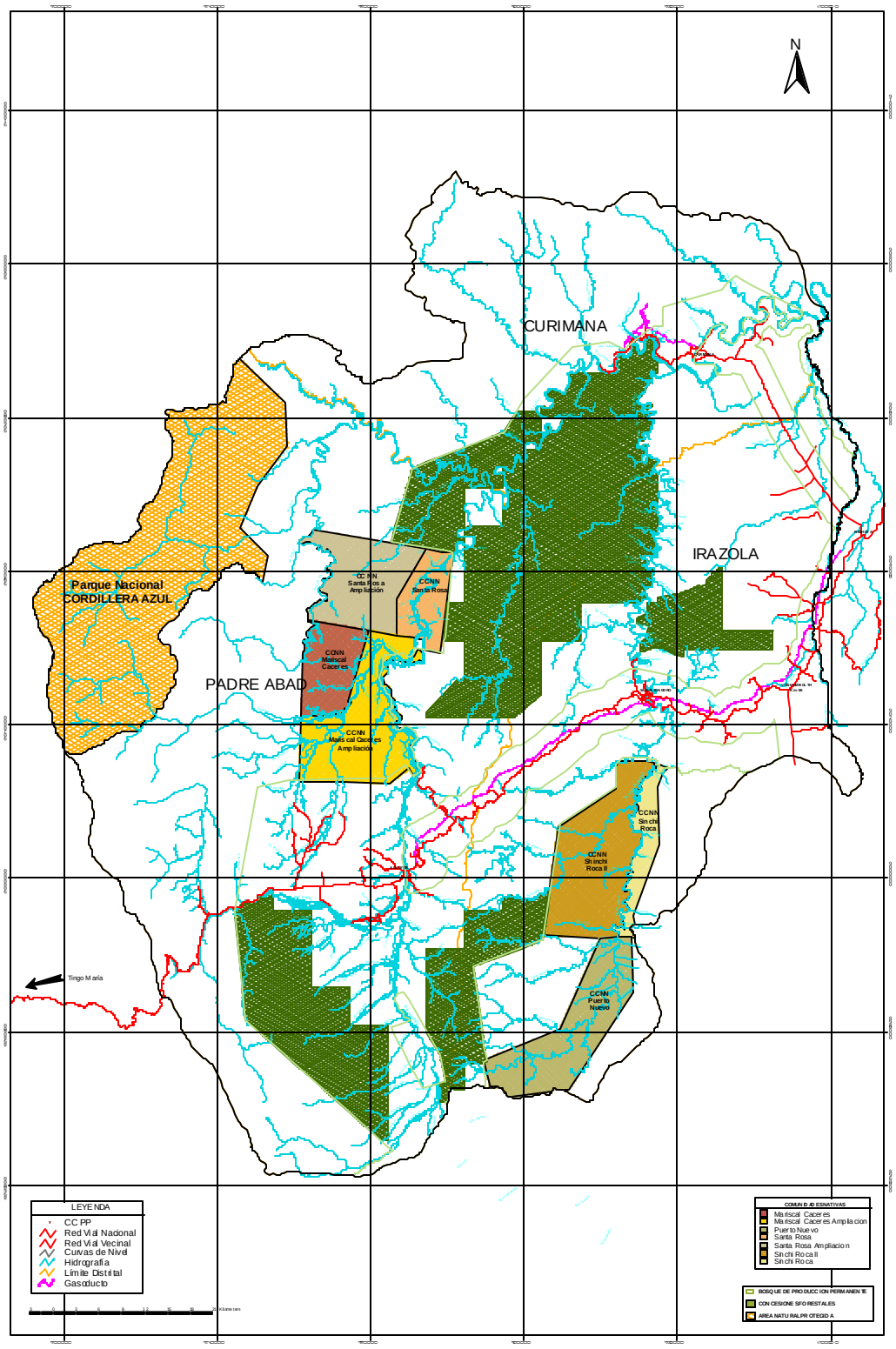
them all their possessions including animals. Few of them know much about the climatic and soil conditions in the area of the Expanded ADP since they come from higher elevations where climatic, vegetative and soil conditions are quite different. Most of the new colonization is occurring at higher elevations above the valley bottoms, where unclaimed forest still exists.

About 75 percent of the population engages in agricultural and livestock production. Extraction of forest products occupies less than 2 percent of the working population. The rest of the population is occupied in commerce, transportation, construction, and fishing. A majority of the population has some type of right to a land parcel although in many areas most people do not have a formal, legal title to the land they occupy.

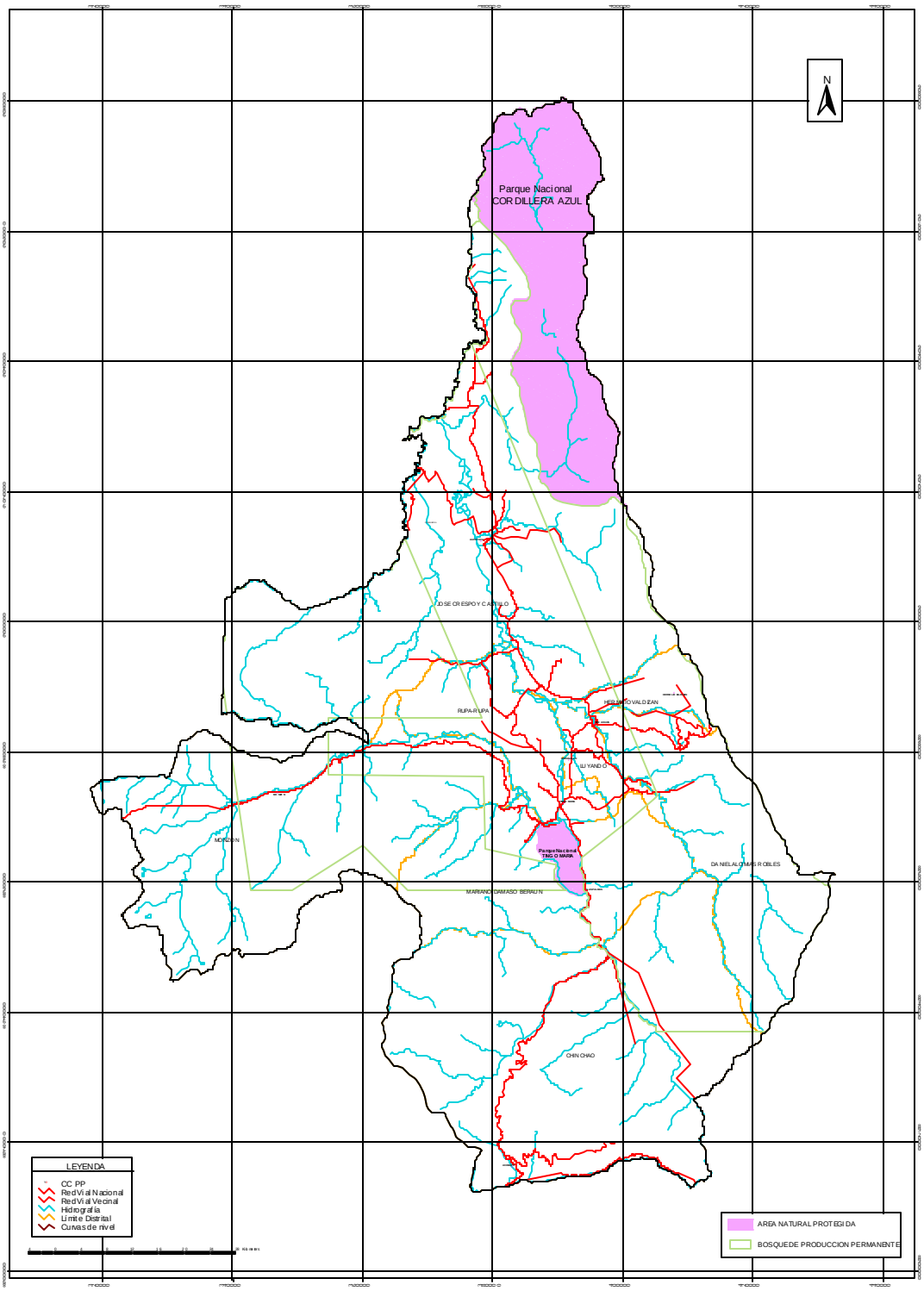
Map 2.1. Expanded ADP Geographical Influence



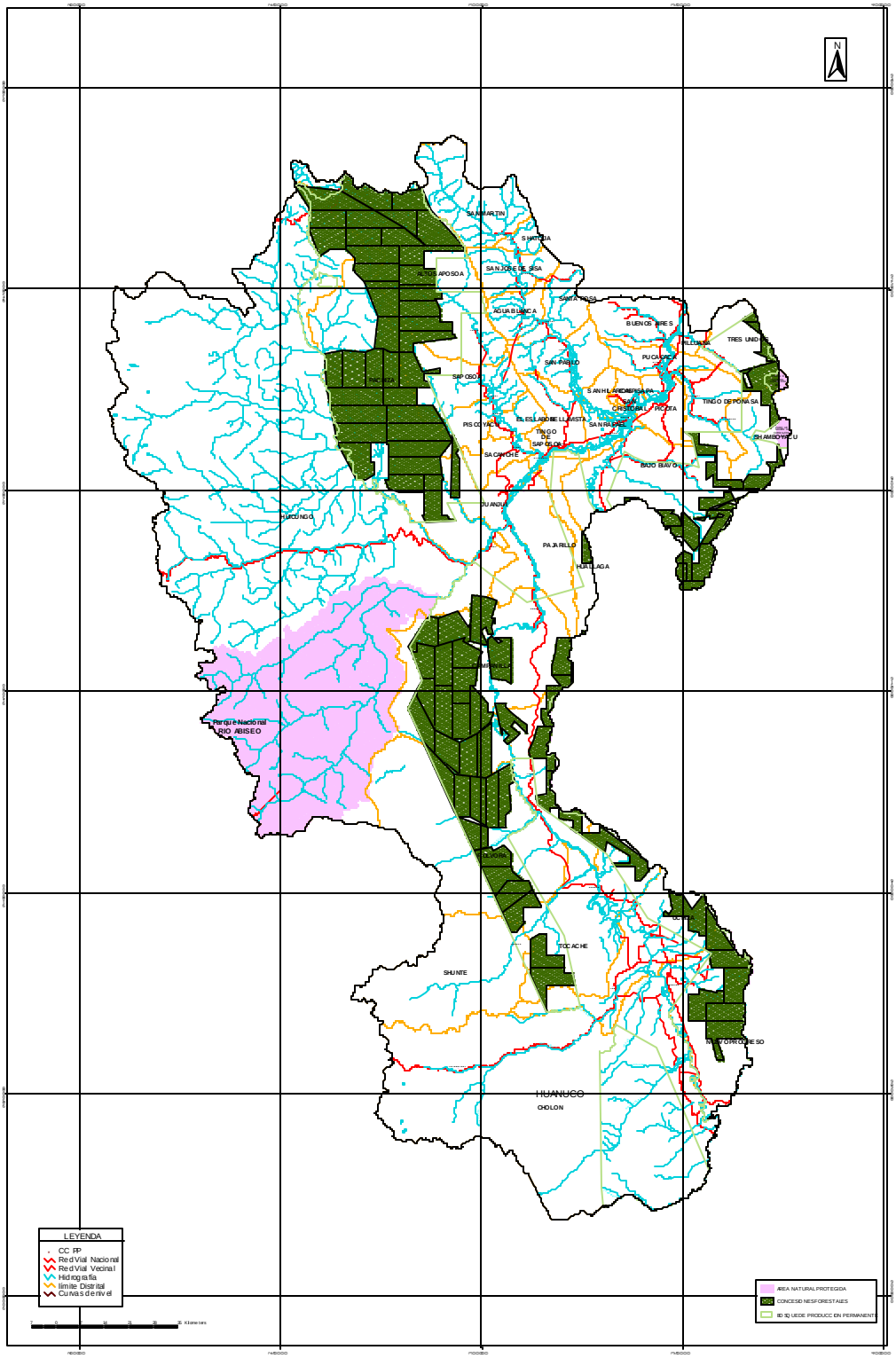
Map 2.2. Aguaytía Valley



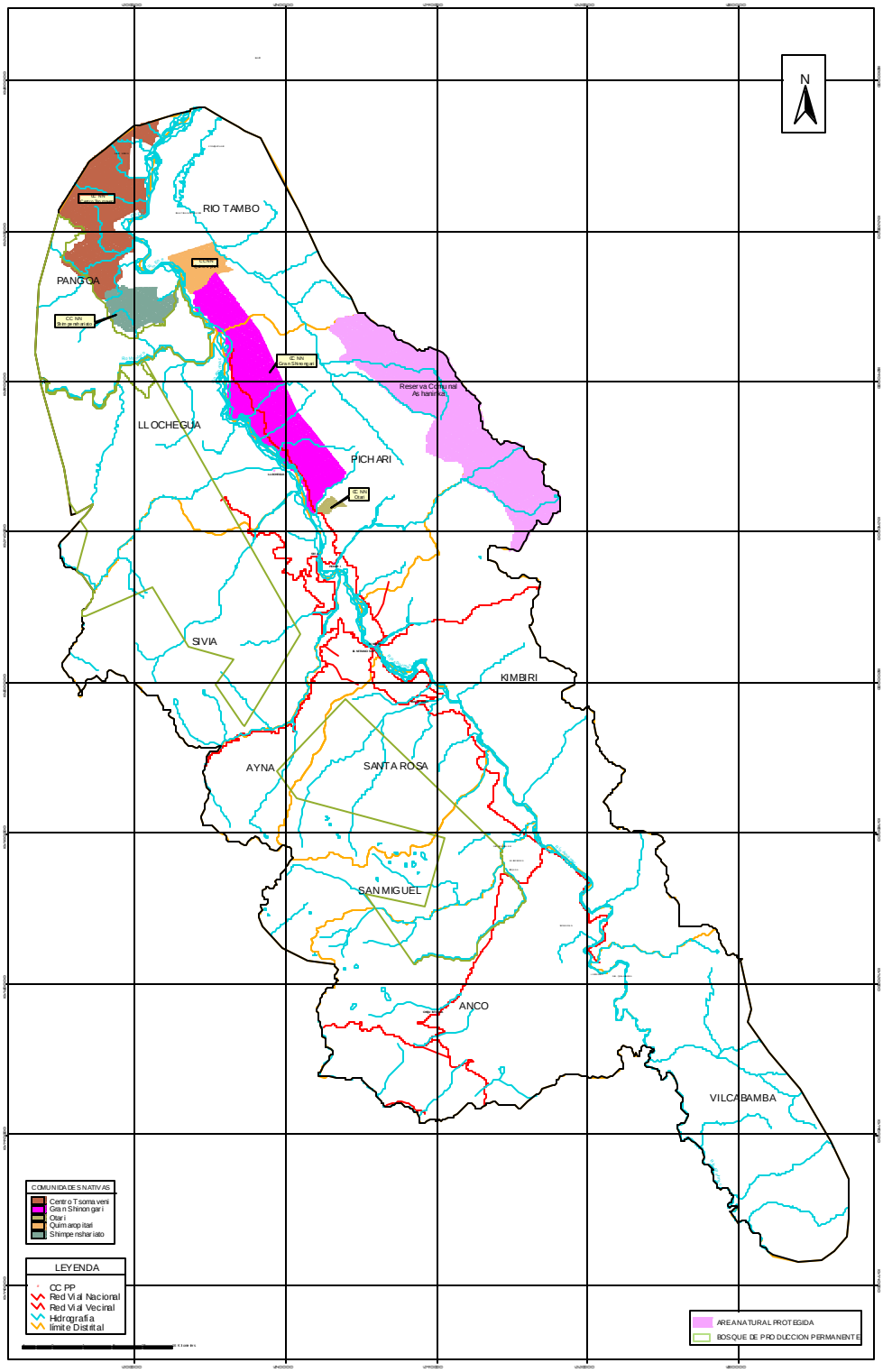
Map 2.3. Alto Huallaga Valley



Map 2.4. Huallaga Central Valley



Map 2.5. VRAE Valley



SECTION III

3 Environmental Consequences and Mitigation Measures

Section 3 discusses the potential environmental consequences and their mitigation measures for the actions that the Expanded Alternative Development Program proposes to finance and that the Environmental Threshold Decision assigned a Negative Determination with Conditions or a Positive Determination. Each section first describes the proposed action. Then it reviews, in the text and in a table, the action's potential negative environmental impacts and the corresponding types of potential mitigation measures. Next, the section discusses the specific environmental issues that the PEA Team identified for this type of action, based on its field observations of projects implemented under the previous Alternative Development Program. Finally, each section summarizes the action's direct and indirect negative environmental impacts in terms of their direction, intensity, scope, reversibility, and duration.

3.1 Construction of Small Scale Public Works

Description of the Proposed Action

Small-scale public works involve the construction of health posts, classrooms, and potable water and sanitation systems. Small-scale public works will be financed under both the Strengthened Local Organizations and the Rapid Response components. DEVIDA and the Principal Contractor will offer two small-scale public works to coca growing communities in exchange for the community's commitment to coca eradication. By their nature, small-scale public works will generally be located in population centers. The total number of each type of small-scale public works and their location will depend on the negotiations with the coca growing communities.

Potential Negative Environmental Impacts and Mitigation Measures

Direct Negative Impacts

Earth movement, destruction of vegetation, and waste disposal cause the principal direct negative impacts associated with small-scale public works. Earth movement can result in soil erosion and soil compaction, which affect the site's capability to support vegetation growth and to regulate water flows. Destruction of vegetation may also result in habitat loss for plants and animals and wider on-site fluctuations in temperatures. Disposal of wastes from construction activities, such as oils, paints, fuels and construction materials, can contaminate water, soil and air.

The magnitude, direction, and duration of such direct negative environmental impacts depend on where and how the small-scale public works are located, designed, constructed, and operated. Construction on a site without natural vegetation and without much earth movement, for example, will not generally cause significant negative impacts on natural vegetation or excessive soil erosion. Likewise, by separating and removing topsoil from the construction site and then

replacing it after construction has been completed, the site's soil productivity around the construction can be maintained, permitting the reestablishment of natural vegetation.

Indirect Negative Impacts

Because many people tend to frequent schools and health centers, they can become focal points for the transmission of human diseases. Thus the environment provided by the design and maintenance of these works could potentially affect the health of many people. Children, for example, spend a large part of their day in schools. If the school lacks adequate provision for and use of sanitation facilities, then the health of students may be affected by disease transmission. Likewise, if health centers and schools lack adequate provision for drainage, then their surroundings may become breeding sites for disease-transmitting insects. Poorly designed or operated potable water and sanitation systems may create unsanitary or unhealthy conditions. If their medical wastes are not disposed of safely, then public health centers may also become significant focal points for the spread of human diseases. Table 3.1 summarizes the potential adverse environmental impacts of and mitigation measures for small-scale public works.

Table 3.1. Small-scale public works: potential adverse impacts and mitigation measures

Potential Adverse Impacts	**Avoidance/Mitigative Actions**
Direct	
Elimination of vegetation to clear construction sites.	Avoid vegetated sites for construction projects. Re-vegetate around construction projects.
Soil erosion and compaction before and during construction	Separate topsoil during site preparation. Replace topsoil after construction. Re-vegetate construction sites.
Contamination of water and soil due to improper disposal of left-over construction materials and solid and liquid wastes	Dispose waste in technically designed sanitary fills. Prevent spills of oil, fuel and cement. Avoid disposition of waste in water bodies.
Indirect	
Adverse human health impacts caused by improper disposal of medical wastes	Installation and regular use and maintenance of proper incineration equipment for medical wastes
Spread of human diseases by insects breeding around public buildings due to poor drainage.	Adequate design, construction, and maintenance of drainage structures around public buildings.
Adverse human health impacts caused by lack of sanitary facilities	Provision and regular use of adequate sanitary facilities including running water for washing hands

Specific Environmental Issues

The 1995-2003 ADP financed the same type of small-scale public works as those proposed for the Expanded ADP.[1] When the ADP began, its administrators gave little consideration to the potential negative impacts on human health of small-scale public works. Classrooms and health centers, for example, initially did not make adequate provision for drainage, sewage, garbage disposal, or potable water. Due to 'ContraDrogas' environmental unit's insistence that all small-scale public works include provision for sanitation and potable water, they began to become standard components of health posts and schools financed by the ADP.[2]

Nonetheless, even by its termination, the ADP did not always make adequate provision for the disposal of solid and liquid wastes produced in and around the school buildings that it financed.[3] In the Central Huallaga Valley, for example, the PEA Team also observed poor drainage around school buildings and health posts that had been recently built with ADP funds.[4] According to the public nurse in the health clinic recently constructed in Pólvora, in the Central Huallaga, his request for equipment to dispose of medical wastes had recently been denied.[5]

Assessment of Environmental Impacts of Small Scale Public Works

If they are adequately designed, constructed, and maintained, the small-scale infrastructure works to be constructed under the Expanded ADP will be likely to cause only short-duration and geographically limited direct negative environmental impacts. By contrast, inadequate drainage, lack of provision of adequate sanitation facilities, and lack of provision for safe disposal of medical wastes could lead to significant negative impacts on the health of the people who use these public works.

3.2 Protected Area Management Plans

Summary of the Proposed Actions

The Expanded ADP will finance the Joint Environmental Agenda. According to the version of the Joint Environmental Agenda made available to the PEA Team, the Nature Conservancy and its Peruvian partners will have responsibility for preparing and implementing protected area management plans for the Tingo María National Park, the Yanesha Communal Reserve, the San

[1] In the 1994 PEA small-scale irrigation systems were included under the category of small-scale public works whereas in the 2003 to 2006 period, ADP they are placed under the category of Economic Infrastructure.
[2] Based on an interview with Lucio Batallanos, Director of the ContraDrogas environmental unit.
[3] In one village, for reasons that were not explained, the school was still using latrines, although the ADP had built new sanitary facilities. The new facilities did not include running water for washing hands. Furthermore they are located only about three meters away from an improvised kitchen. These conditions could be conducive to the spread of sicknesses between school children.
[4] The public nurse in the public health post in Pólvora confirmed to the PEA Team that malaria is endemic in that part of the Central Huallaga Valley. He also expressed his belief that standing water around schools, health posts, and residences could provide breeding sites for disease-carrying mosquitoes. The occupant of a dwelling next to a dripping standpipe observed to the PEA Team that there were many more mosquitoes around his house now than previous to the installation of the standpipe.
[5] The public nurse in the health clinic of Pólvora informed the PEA Team that his request for funds to purchase the proper equipment for incineration of medical wastes had been denied. This health center, therefore, buries its medical waste without incineration.

Matías-San Carlos Protection Forest and for preparing a proposal for the declaration of a Central Selva Biosphere Reserve. No additional information, however, was made available to the PEA Team regarding these proposed management plans. Nor was the PEA Team able to visit these protected areas. It cannot, therefore, comment more on these activities of the Joint Environmental Agenda.

The version of the Joint Environmental Agenda made available to the PEA Team does not mention the Cordillera Azul National Park. Nonetheless, the Expanded ADP is already financing the Chicago Field Museum to prepare a management plan for this park and implement small, income generating activities with communities in the western part of the park's buffer zone

Potential Negative Environmental Impacts and Mitigation Measures

Direct Negative Impacts

The preparation of management plans for a protected area involves consultations, studies, mapping, and report writing. These actions will not in themselves cause negative environmental impacts. A protected area management plans may, however, recommend actions that could cause direct and indirect negative environmental impacts. It may include, for example, the construction of infrastructure for administration and tourism, such as buildings, roads and docks. Such construction could cause short-term direct negative environmental impacts through the elimination of vegetation, the movement of earth, changes in drainage patterns, and contamination of air, water, and soil. The subsequent use of infrastructure may generate wastes that contaminate water, soil and air, trash and contamination of water bodies. Motorized vehicles may create water, air and noise contamination and directly kill slow moving animals. Increased movement of people through a protected area could result in the introduction of exotic species and affect the habits and habitats of wild animals. The waves created by fast boats in narrow waterways can cause bank soil erosion and change the natural habits of wildlife. The protected area management plan can itself identify such potential negative direct impacts and specify measures to avoid or mitigate them.

Indirect Negative Impacts

The establishment and management of a protected area may stimulate additional tourism. The principal indirect impacts of increased tourism are likely to be on populations of indigenous peoples. Contact with tourists could expose indigenous peoples to new diseases and cultural practices. Tourism sometimes represents a shift for indigenous people to a cash-based economy and an influx of cash into an indigenous culture may affect the relative position and power of its members, causing drastic changes in their social relationships. An influx of tourists may also change the relationship of indigenous peoples with their natural environment. Indigenous peoples may devote more time to attending tourists and less time to hunting wild animals. Traditional knowledge of forest resources, for example, may no longer be required. Consequently the knowledge of forest plants and animals, formerly essential for survival, may become unnecessary and be lost to the indigenous culture. On the other hand, hunting pressure on wild animals may decrease and their populations may expand in numbers.

These types of indirect negative impacts from the existence of a managed protected area can generally be avoided or mitigated. The protected area's management plan must take such potential indirect impacts into account and provide effective avoidance or mitigation measures. It should, for example, consider the need for inoculation and other health programs. Indigenous peoples should be prepared to understand, absorb, and take advantage of the establishment and management of a protected area without suffering significant negative impacts to their own health or culture.

Table 3.2 summarizes the potential adverse impacts of the forest management plans and avoidance or mitigation measures.

Table 3.2. Potential adverse impacts and mitigation actions for protected area management plans

Potential Adverse Impact	Avoidance/Mitigative Actions
Direct	
Construction site located in agricultural or natural vegetation.	Avoid construction projects in agricultural lands or where there is natural vegetation.
Removal of soil and plant cover at and near construction sites and deforestation in the vicinity of the structures.	Separate topsoil during site preparation. Replace topsoil after construction. Re-vegetate construction sites.
Improper disposal of excess and waste construction materials, items required for operation and maintenance of equipment and solid and liquid waste.	Dispose waste in suitable sanitary fills. Prevent spills of oil, fuel and cement. Avoid disposition of waste in water bodies.
Operation of equipment causes soil, water and air contamination	Select suitable equipment. Prevent spills of oil, fuel and cement.
Indirect	
Increased tourism brings indigenous peoples into contact with infectious diseases to which they do not have resistance.	Plan and control contacts between tourist and indigenous communities
Increased tourism affects indigenous cultures.	Prepare indigenous people's to withstand the impacts of different cultures.

Specific Environmental Issues

The Threshold Decision requires that the protected area management plans include an environmental assessment of their potential environmental impacts and that the Terms of Reference for their preparation be submitted to LAC/BEO for approval prior to initiating activities. The PEA Team was not made aware of any Terms of Reference for the preparation of the protected area management plans to be financed with Expanded ADP funds. If these Terms of Reference have not been prepared and approved by the LAC/BEO.

CIMA and the Chicago Field Museum will promote economic activities, such as tourism, for people living in the "buffer zone" along the boundaries of the Cordillera Azul National Park. Such assistance is intended to make these inhabitants allies in, rather than opponents of, the park's protection. The proposed economic activities are small scale and will be unlikely to cause significant negative environmental impacts.

One of the principal threats to the integrity of the national parks comes from the construction, improvement or rehabilitation of roads up to or close to their boundaries. Such roads often permit agricultural less expensive and easier access to unoccupied forestlands along the boundaries of the protected areas. Once the human populations outside of the park boundaries increase due to agricultural colonization the park's integrity is no longer protected simply be their remoteness. When it is no longer so difficult to reach the park, it may become subject to agricultural colonization also. It will generally be difficult to control colonization. The small populations of existing inhabitants will have little power or even desire to control agricultural colonization on land that does not belong to them. Therefore, protection of the protected areas from agricultural colonization will depend on the cooperation of adjacent municipal governments and restriction of road building up to the park's boundaries. The PEA Team, however, did not identify a clear link between the planned road construction, rehabilitation or improvement activities to be financed with Expanded ADP funds and the park management activities to be financed under the Joint Environmental Agenda, also with Expanded ADP funds. It recommends, therefore, that the link between these two components of the Expanded ADP be explicitly identified and strengthened.

Assessment of Potential Environmental Impacts of Protected Area Management Plans

The preparation of management plans for protected areas will in general bring positive, long-term environmental benefits. Protected area management plans will positively influence the protection and management of these areas for many decades. In doing so they will help to protect large areas of tropical forest and biodiversity. The management plans could be made more effective, however, if they specifically include actions to gain the support of the municipalities along their boundaries. If these adjoining municipalities control agricultural colonization and restrict road building up to the park boundaries, then the influx of agricultural colonists could be reduced. Establishment of municipal local and protected forests, as permitted in the Peruvian Forestry Law and Law for Protected Areas, along the park boundaries would be a practical expression of municipal support for park protection.

3.3 Natural Forest Management

Summary of the Proposed Actions

The Expanded ADP will finance the preparation of forest management plans, and forest management itself, through three mechanisms: the Principal Contractor, the World Wildlife Fund (WWF), under Joint Environmental Agenda, and the Poverty Relief and Alleviation Project (PRA). As of mid-September 2003, all three institutions had begun to assist concessionaires and indigenous communities to prepare forest management plans. It was not possible, however, for the PEA Team to investigate thoroughly the status or content of these management plans.

According to the Joint Environmental Agenda document, the forest management component of the Expanded ADP will mitigate the negative indirect impacts on tropical forests from road improvement projects and provide income to former coca growers. The forest management component will provide training and technical assistance for community forest management

including forest certification, award and management of forest concessions; identification, reforestation of degraded areas, and planning for forest management in selected watersheds.

The WWF has also presented to USAID/Peru for financing as part of the Joint Environmental Agenda under the Expanded ADP the proposal "Von Humboldt Aguaytía Integrated Pilot Project – Alternative Sustainable Forest Resource Use." This proposal, which requests funding for three years, includes (1) the preparation of forest management in the Von Humboldt Forest that meet the criteria for certification under the criteria of the Forest Stewardship Council (FSC) for 163,212 ha of primary forest and maintenance of 63 km of roads over two years; (2) reforestation of a 90 km strip along both sides of the San Alejandro-Aguaytía road with fast growing native commercial tree species; (3) community-based secondary forest management, agroforestry systems, and Local Forests in 50,000 ha of primary forest and 100,000 ha of secondary forest as well as reforestation and establishment of agroforestry practices on an additional 60,000 ha; (4) a small loan financial service that will provide short-term loans for working capital to develop and manage primary forest under forest concessions, secondary forests and agroforestry production systems.

Potential Negative Environmental Impacts and Avoidance/Mitigation Measures

Direct Negative Impacts

Non-technical harvest of forest products may cause a variety of direct negative environmental impacts. Logging practices can augment erosion and cause sedimentation in water bodies, especially at the points where skidding trails or logging roads cross water bodies. If logging is so intense that the flow of superficial water augments then the variations in the flow levels of streams and rivers can increase. Such changes in water flow patterns can affect aquatic organisms. The construction of roads and skidding trails through the forest can cause soil compaction. Forest workers may hunt wildlife for food, causing significant impacts on species variety and total number of animals. The felling of a few of the larger commercial trees may cause damage to many smaller, non-commercial plants. Cutting of only a few species or only the most valuable stems of a few species may cause changes in the species and genetic floral composition of the forest. Over-harvesting of non-timber forest products may result in drastic reductions in populations of certain commercial species. Logging camps may cause direct negative environmental impacts on the surrounding environment both in their construction and operation, through earth movements and discharge of waste products. Forest workers may not come from the local area and therefore may introduce diseases and social customs that affect the local people.

The magnitude and permanence of the direct negative impact is a function of the site conditions, the type of forest, the frequency of commercial species and the relationship between these species and the reproduction of the forest's fauna. Most of these direct negative impacts from forest management can be avoided through the application of adequate forest management practices as established in forest management standards. Technical standards include requirements for information basic to adequate forest management. Such information includes maps with an appropriate scale and essential information, such as topography and the location of water bodies. Forest resource inventories carried out at a technically adequate intensity underlie

sound forest management planning. Infrastructure, such as logging roads, landings, skidding trails, and buildings, must meet adequate technical specifications. Silvical information on the species to be harvested should be sufficient to ensure adequate regeneration and the maintenance of the forest's range of species.

Indirect Negative Impacts

The largest, most widespread and irreversible indirect negative impact associate with logging is the colonization and deforestation that frequently occurs after the construction of logging roads and skidding trails into the forest. Throughout the Amazon basins colonists have followed logging roads and trails into the forest. In most situations, loggers and the government have been unable to control or prevent this process of spontaneous colonization. Colonization and deforestation has eliminated the possibility for permanent, technical forest management over large areas in eastern Peru. On the other hand forest management carried out according to technical standards and procedures provides a land use that if widely adopted would provide an alternative to deforestation. The maintenance of forest cover would preserve multiple forest environmental services such as regulation of the water flows, and preservation of habitats for plants and animals.

Table 3.3. Potential negative environmental impacts and mitigative actions for forest management plans

Potential Adverse Impact	Avoidance/Mitigative Actions
Direct	
Use of logging equipment and construction of access roads causes soil erosion that affects aquatic organisms, loss of soil nutrients, and soil compaction.	Avoid logging in rainy season, use technically appropriate logging equipment, plan logging roads and skidding trails based on technical standards, and provide adequate supervision.
Selective logging diminishes species variety, causes genetic erosion, affects habitat for plants and animals. Excessive removal of large stems opens forest to the invasion of weed species and increases the risk of fire.	Leave adequate representation of reproducing stems of each species. Assure adequate regeneration through proven silvicultural techniques. Leave well-located reserves with the full complement of species, control intensity of extraction through adequate inventories and supervision.
Forest exploitation operations leave solid and liquid wastes in the forest.	Establish and enforce regulations for disposal of liquid and solid wastes.
Operation of noisy extraction equipment changes wildlife habits.	Make logging operations as efficient as possible through the use of technical standards, appropriate equipment and adequate supervision.
Logging slash increases risk of fire.	Evaluate fire potential and take appropriate action to reduce logging slash.
Increased human presence in the forest increases hunting pressure on wild game animals.	Prohibit hunting by logging crews and enforce prohibition.
Workers in forest exploitation affect cultures of forest inhabitants and introduce diseases.	Provide adequate training and supervision of logging crews.
Indirect	
Uncontrolled access to the forest by colonists through the opening of logging roads.	Assignation of private property rights for forested areas through sale by auction. Establishment of local forests under the control of local governments or organizations that ensure a significant flow of benefits from the forest to local populations.
Deterioration of local roads through the use of over-weight logging trucks.	Enforce weight limits on logging trucks.

Specific Environmental Issues

The forest management component of the Expanded ADP will utilize USAID funds to plan and promote logging in highly biologically diverse tropical forests, a specific concern of Sections 118 and 119 of the Foreign Assistance Act. For that reason, the Threshold Decision specifically requires that the forest management plans include an environmental assessment of their potential direct and indirect environmental impacts and that the Terms of Reference for their preparation be submitted to LAC/BEO for approval prior to initiating activities. As of mid-September 2003, a number of forest management plans had been prepared with financing from Expanded ADP funds. These forest management plans were prepared using the official Terms of Reference that have been prepared by the Institute of Natural Resources (INRENA) of the Peruvian government. So far as the PEA Team could ascertain, the LAC/BEO has not officially approved

these Terms of Reference. The PEA Team did not, however, have an opportunity to review, either in documentation or in the field, the forest management plans that have already been prepared under either the Joint Environmental Agenda or the PRA project.

The Expanded ADP funding will finance assistance to INRENA in establishing a forest concession system based on technical forest management practices. The use of technical forest management practices will produce positive environmental impacts. Rather than the present haphazard planning of roads and skidding trails, roads will be laid out and constructed based on technical standards. Directional felling will reduce damage to the residual stand. The application of silvicultural techniques will stimulate adequate regeneration of the species that are removed and thus maintain species composition. By restricting logging in areas adjacent to water bodies or which contain habitats that are important for endangered plant or animal species water quality will be protected. If the concessionaire can control access to the forest along logging roads by agricultural colonists, then large areas of forest will be kept under forest cover, rather than being converted to other land uses. The production and commercialization of forest products could create jobs that will provide an alternative to coca production and provide incentives for local people to protect and manage forest rather than eliminate it to use the land for agriculture and pasture.

The control of the negative direct impacts from the industrial forest concessions, however, depends on adherence to adequate technical standards for forest management plans and the ability to control access and colonization in the forested areas. The Forest Stewardship Council's Principles and Criteria provide a standard against which the forest management plans and their implementation can be objectively assessed. Moreover, the Forest Stewardship Council's standards for forest management have guided the preparation of forest management plans; given that certification is one aim of the Expanded ADP's forest management program. This PEA recommends, therefore, that the environmental review of the industrial concession component of the Expanded ADP be provided for by contracting a certifying company to evaluate the industrial forest concessions management plans and practices against the FSC standards. Review by a certifying organization will both advance the certification process and provide for independent environmental review of the support the Expanded ADP provides to industrial forest concessions. This review of the industrial forest concessions by an independent certifying agency should adhere to its normal practices, involving scooping studies before certification and annual audits during each subsequent year.

If the certifying entity is able to visit more than one concession under a single contract the total cost per industrial concession should be greatly reduced.[6] Even so, it would, however, be excessively expensive to carry out the certification scoping studies on every industrial concession which has received some type of financial support from Expanded ADP funds. Therefore USAID and the certifying entity should randomly select a sample of at least 10 percent of the industrial concessions for review by the independent certifying entity each year. The

[6] If the industrial concessions that are receiving financial support from the Poverty Reduction and Alleviation Project (PRA), also financed by USAID/Peru, were also to be evaluated under the same contract, then the cost per concession would probably be reduced even further. Such an arrangement would also standardize the USAID/Peru procedures for meeting the requirements of the FAA 118 and 119.

results of these reviews should, however, be utilized in improving the overall support that the Expanded ADP provides to Perú´s system of industrial forest concessions.

Forest management can both increase and control negative indirect environmental impacts of road construction. On the one hand, forest management often requires road construction in order to allow less expensive access to the forest for management activities. Such road construction lowers the cost of forest management, making it a land use that is more competitive with alternatives, such as agriculture or pasture. On the other hand, the construction of roads into forested areas frequently stimulates an influx of agricultural colonists. The concessionaires are unlikely to be able to control such colonization by themselves and governments unlikely to be willing to exert much control over agriculture colonists.

If, however, the forest concessionaires were able to establish their control over forest management units and not permit their invasion by agricultural colonists, the forest concessions could mitigate the potential negative environmental impacts of road construction and coca eradication financed by the Expanded ADP. Road construction, rehabilitation or improvement in forest areas invariably stimulates an influx of agricultural colonists and deforestation. If the forested areas were under the control of forest concessionaires, however, then the agricultural colonists would not be able to invade forested areas and eliminate the forest.

Likewise, coca eradication does not lessen the demand for coca leaves. Under some circumstances, it may even increase the value of coca leaves and therefore stimulate the planting of new coca plantations. Some of these coca plantations may be planted in remote, forested areas, stimulating increased deforestation. The establishment of forest concessions in large areas of forest may, therefore, serve to mitigate the indirect negative environmental impacts of coca eradication. The effectiveness of forest concessions as a mitigation measure depends on their ability to control an influx of agricultural colonists, in this case those who intend to plant coca.

It also depends, however, on the choice of forest concessions that the Expanded ADP chooses to assist. If the Expanded ADP assists forest concessions that are within the area of influence of the roads that it constructs, rehabilitates or improves, then the possibility exists that they will serve as a mitigation measure for the roads. If the forest concessions, however, are in other areas, out of the range of influence of the roads, then they will not serve as a mitigation measure for the road program. They may, however, in those cases serve as a mitigation measure for the coca eradication program, if they are in areas that are suitable for coca cultivation.

Summary Assessment of Likely Environmental Impacts of Forest Management Plans

Organized, technical forest management mitigates the direct negative impacts on tropical forests and biodiversity of extraction of forest products while increasing their quantity, quality and reliability of production. Forest management also can serve as an effective mitigation measure for the indirect negative impacts of other Expanded ADP activities, such as road construction and improvement and coca eradication. If properly planned, implemented, and monitored, therefore, the Expanded ADP's forest management component will produce significant positive environmental impacts. Extraction of forest products without the application of professional practices and standards, however, risks long-term, irreversible impacts on tropical forest

ecosystems and their biological diversity. Also, the forest concessionaires must have the means to control invasions by agricultural colonists.

3.4 Road and Bridge Construction, Rehabilitation and Improvement

Summary of the Proposed Actions

Inadequate economic infrastructure in most parts of the alternative development areas, namely good access roads, well-maintained bridges, sufficient small irrigation systems, and widespread coverage of electrical distribution, constrains the development of a licit economy. Thus the Expanded ADP will continue to finance the construction, rehabilitation, maintenance and repair of small-scale economic infrastructure projects, such as the improvement or construction of roads bridges, small-scale irrigation and electrification systems.[7]

Such infrastructure projects originate through the identification by municipal governments of their most urgent infrastructure needs. These governments then solicit financing for this infrastructure through the Special Projects or the Associations of Municipalities. Progressively higher levels of administrative review these needs and assign financial resources according to potential economic impact. This process of identification and review of needs takes place year-by-year. Thus the location and scale of economic infrastructure has not yet been determined.
Tertiary roads, not major highways, will be constructed, improved, or rehabilitated under this component. The location and length of these roads and bridges has not yet been determined.

Potential Negative Environmental Impacts and Avoidance/Mitigation Measures

Direct Negative Impacts

Direct negative environmental impacts of road construction, rehabilitation, and improvement occur on and next to the road site. Soil erosion is the principal potential direct negative impact. If the road project takes place during heavy rains, especially if the road is on steep slopes, extreme, irreversible soil erosion, sometimes resulting in canyons, may result. The opening of gravel pits or the use of river beds for the excavation of road material may cause sedimentation that affect aquatic organisms. Road projects may also sometimes cause air pollution through the operation of equipment or through burning or waste materials. If solid and liquid wastes, such as oil and gasoline, are not properly disposed of they may contaminate water bodies, affecting aquatic organisms. Road projects may also cause the destruction of vegetation on and next to the road right of way. Workers on road projects may kill game animals for food.

Proper technical planning, implementation, and worker supervision are the principal means to avoid direct negative impacts of road projects. Of these perhaps the most important is the selection of the road route. By proper selection, many problems of soil erosion and destruction of valuable vegetation can be avoided. Such selection requires adequate information on soils, topography, vegetation, and water bodies.

[7] Whereas the documentation for the previous ADP mentions only "rehabilitation and improvement" of tertiary roads, the documentation for the 2003 to 2006 ADP also includes "construction" of tertiary roads.

Indirect Negative Impacts

The principal indirect negative impact of road projects occurs when the road penetrates formerly inaccessible forested areas and permits colonists to migrate to and deforest adjacent lands. Frequently, the deforestation of such lands by colonists is impossible to control and the result is widespread deforestation and soil degradation on sites that do not have potential for permanent agriculture. While society loses valuable forest goods and services, it frequently gains little of permanent economic value.

The construction of bridges may also indirectly adversely affect tropical forests and their biological diversity. The impact will depend on the location and characteristics of the bridge. Bridges that cross a large river that can not be forded even in the dry season may, for example, permit access by vehicles to forested areas that were previously inaccessible. They may, therefore, stimulate a process of logging followed by colonization and deforestation. This process, especially when it occurs on land that has been classified as suitable only for forest cover, will result in the loss of tropical forest and the biodiversity that they contain.

If roads are not properly maintained after their construction, they may cause indirect negative impacts over long periods. Also they may require reconstruction which will cause a repetition of the original negative direct impacts.

Table 3.4. Potential adverse impacts and avoidance/mitigative actions for road and bridge construction, rehabilitation and improvement

Potential Adverse Impacts	Avoidance/Mitigation Measures
Direct	
Soil erosion from talus slopes and earth movement causes sedimentation into water bodies altering water flow regimes and quality	Plan construction to minimize soil movement. Avoid construction during rains. Specify appropriate equipment to permit deposit of material on appropriate dump sites. Cut talus slopes to appropriate angle of repose. Revegetate bare soil with appropriate vegetation. Design, construct and maintain effective drainage systems.
During construction, sediment carried into receiving water bodies by runoff alters water local flow regimes	Construction during dry season, speedy and well-coordinated construction schedule to minimize loose earth.
Soil and water contamination from oil, batteries, grease, tires, trash and human waste.	Design and implement appropriate waste disposal procedures including service of equipment in designated sites, provision and use of adequate equipment.
Indirect	
Deforestation as a result of uncontrolled colonization causes loss of biological diversity and soil erosion.	Assign clear and enforceable use rights to forested areas and stimulate markets for forest products.
Construction of bridges across large rivers may open forest areas to road penetration and colonization, stimulating deforestation.	Increase flow of benefits from forests to local inhabitants. Land use controls through the establishment of forest management units that provide benefits to local populations.

Source: PEA Team and World Bank (1991)

Specific Environmental Issues

The Expanded ADP's strategy involves exchange of benefits for voluntary coca eradication. Coca farmers will almost certainly frequently identify road construction and improvement as their principal priority. The Expanded ADP is likely, therefore, to finance considerable road construction and improvement. Such road construction and improvement will be the principal source of direct and indirect negative environmental impacts under the Expanded ADP.

The Humapaza-San Juan case study indicates that under the ADP's mitigation measures for direct negative impacts were not always implemented adequately. Field inspections by the PEA Team indicated that for that road the drainage systems are poorly designed and constructed and lack proper maintenance. The location of that road, and many others in the Expanded ADP area, was not determined according to technical criteria and careful planning, but rather followed a preexisting logging road and a mule trail. Knowledgeable informants indicated to the PEA Team that restricted budgets sometimes have resulted in lowering of technical standards for road construction and the improvement and elimination of some environmental mitigation measures as well as under-investment in road construction. In order to win a bid, contractors frequently make unrealistic financial offers since Peruvian regulations require that the lowest bid be awarded the contract. Winning contractors then invest less than required in such parts of the road as the thickness of the surface, drainage structures and transport of cut material to dump sites. The consequences of such budget shortfalls are often direct negative environmental impacts.

The 2002 *Study of the Impact on Natural Forests of the Road Improvement Program in the Alternative Development Valleys* thoroughly reviewed the indirect negative impacts of the road improvement projects financed by the ADP between 1995 and 2002. It found a close association between the extent of deforestation and the road improvement projects. Half of the roads that the ADP financed were penetration roads that provided increased access to colonists to tropical forest areas, mostly at higher elevations and often close to the boundaries of national protected areas. The study found that ADP did not establish an effective process for identifying and mitigating the indirect negative environmental impacts on tropical forests, biodiversity and protected areas from road construction, rehabilitation and improvement projects. It had, therefore, taken few effective measures to avoid or mitigate the indirect negative impacts on tropical forests and biodiversity that resulted from the road improvement program.

The Expanded ADP's overall strategy for coca elimination will be likely to stimulate demand for additional road construction and rehabilitation. As coca is eradicated on more accessible sites, its cultivation will move to more remote sites. Coca farmers on these more remote sites will be likely to request road construction and improvement in exchange for voluntary eradication. Road improvement activities in more remote areas, where more forest remains, will generally cause more significant negative impacts on tropical forests and biodiversity than in less remote areas.

In the Apurimac Valley the Special Development Project intends to use funds from the Expanded ADP to construct a number of bridges. These bridges and some additional road construction or improvement will be likely to provide increased access to forested areas on the east side of the Apurimac Valley. Concurrently with the planning for the construction of these bridges, therefore, the Expanded ADP should finance actions to plan and implement measures to slow or prevent

additional deforestation on the east side of the Apurimac Valley. As for the road construction and improvement component, these measures should include the establishment of Local Forests under the control of the municipal government.

The Expanded ADP should establish a direct, close link between the road construction and improvement component and the implementation of mitigation measures for indirect negative impacts. The 2002 Study *of the Impact on Natural Forests of the Road Improvement Program in the Alternative Development Valleys* recommended a methodology that would establish such a link. In brief, in forested areas, as identified by the maps prepared for this PEA, planning for the mitigation of indirect negative impacts from road construction and improvement must begin concurrently with planning for the road project. The adoption of mitigation measures for indirect negative impacts on forests should become part of the negotiations with the community that will eradicate coca in exchange for the road project. The institution contracted by USAID will have the responsibility for assuring that the mitigation measure is included in these negotiations. Before approval of a road project in a forested area, its beneficiaries, together with the municipal government, must provide written concurrence with the mitigation measures and begin their implementation.

The principal mitigation measure for road construction, improvement, and rehabilitation projects in forested areas will be the identification and demarcation of areas of protection and production forest that are within the area of influence of the proposed road project. Roads generally influences land use within a distance of approximately 5 km. All of the forest that remains within this area must be designated by the local community or government as permanent forest area before a road project can be approved for financing with Expanded ADP funds. The forest can be established as an official Local Forest or industrial forest concession, as defined in the Forestry Law, or as a Protection Forest, as established in the Law of Protected Areas.

USAID will subcontract the implementation of most field activities under the Expanded ADP, including road construction and rehabilitation. This will be likely to improve the mitigation of negative environmental impacts as compared to the Alternative Development Program. First, the Contractor will be responsible for oversight of the technical standards to which roads, and other projects, are built or rehabilitated. The Contractor will have more flexibility to enforce technical standards than the Special Projects or other Peruvian government entities had. The Contractor, moreover, will utilize its own engineers. These will have the incentive to enforce compliance with environmental standards or risk termination of their contracts. They will thus be motivated to ensure that the funds allocated for environmental mitigation measures are actually spent for that purpose. Second, the Contractor, as a private entity, will not be required to follow Peruvian government regulations that require construction projects to be awarded to the lowest bidder. It will be able, therefore, to select proposals on the basis of their technical merit and adequate budgets, including provision for effective mitigation of direct and indirect negative impacts. Third, the Contractor will be able to include specific language in the contracts that it awards requiring effective mitigation of negative environmental impacts associated with alternative development activities.

Summary of Potential Environmental Impacts of Road and Bridge Construction, Rehabilitation and Improvement

Of all the proposed activities to be financed with USAID/Perú funds under the Expanded ADP, the road and bridge construction and improvement have the greatest potential to contribute to permanent, irreversible, geographically large-scale negative impacts on tropical forests and biological diversity. Improvement of access routes into formerly inaccessible forest area, especially when the lack clear ownership or use rights, inevitably attracts agricultural immigrants from the Peruvian highlands. They establish control over land through deforestation and agricultural and livestock production. So far no effective means of constructing or improving roads without stimulating increased immigration and deforestation has been devised. One method that may establish incentives for the local governments, with the support of existing inhabitants to restrict further immigration is to assign responsibility for the control and benefits of the remaining unclaimed forest to the municipal rather than the central government. If the existing inhabitants perceive advantages to themselves of controlling immigration and reducing the rate of deforestation they may demand such control from their municipal governments.

3.5 Irrigation Systems Construction, Improvements and Operation

Summary of the Proposed Actions

A principal means to increase agricultural per hectare yields, improve product quality and extend the production season, is through irrigation. Irrigated land may provide double or more the yield of non-irrigated land. Thus in the Expanded ADP area, irrigation will play an important role in establishing a licit economy through the promotion of financially viable licit crops such as sugar cane, rice and corn. For that reason, the Expanded ADP will finance the construction, improvement, and extension of small-scale irrigation systems, although their extent and location is not yet known.

Potential Negative Environmental Impacts and Avoidance/Mitigation Measures

Direct Negative Impacts

Surface irrigation on sloping ground can cause soil erosion that removes productive topsoil. Sediment in irrigation runoff may fill downstream drain ditches, ponds, and streams. Sediment also degrades water quality in rivers and lakes, increasing the cost of water treatment and making downstream irrigation more difficult. Sediment in rivers and lakes increases turbidity and water temperature and can change the species composition of aquatic plants and animals. Sediment in the irrigation water that returns to the streams and rivers when combined with reduced river flows may result in sediment accumulation in rivers. Such sediments can cover fish spawning areas and promote excessive aquatic plant growth. Sediment accumulation in storage reservoirs reduces their effective storage and useful life. Phosphorus is often attached to eroded soil particles. When these sediments enter water bodies, this phosphorus acts as a nutrient and promotes excessive growth of algae and aquatic weeds.

Soil quality, defined as the ability of soil to provide sustained high productivity of vegetative matter, can be degraded by irrigation. Salt accumulation reduces soil productivity and eventually results in the poisoning of the land. Salt accumulation is usually caused by inadequate drainage and is often associated with water logging. All irrigation water contains some salt that must be leached through the soil and disposed of with drainage water to some other acceptable sink. All groundwater also contains salt. When irrigation with inadequate drainage results in high water tables, evaporation of groundwater through the soil will result in salinization of the soil. Good management of irrigation water, including the leaching of salt from the soil, drainage for the removal of salt, and ultimately, transport and disposal of the salt to other sinks, is required to prevent soil salinization. In some areas, irrigation dams and diversions dry up streambeds directly affecting aquatic organisms.

Indirect Negative Impacts

Irrigation water provides the means by which exotic organisms and plant and animal pathogens expand their range. As water crosses irrigated fields and drains into rivers and lakes it may spread seeds, plants and organisms across the landscape. These exotic organisms and pathogens may adversely affect indigenous organisms, changing the relative species composition and ecosystem functions.

Agricultural intensification may increase groundwater contamination when it involves more use of agrochemicals such as pesticides and fertilizers. Greater efficiency in the use of irrigation water may reduce the amount of water reaching downstream wildlife habitats. Similarly, upstream developments are likely to impact on an irrigation system either in the form of reduced water availability (surface or groundwater) or reduced water quality. Different types of irrigation will have different social impacts. Modern irrigation methods may not necessarily cause less impact than traditional methods. Impacts will also vary according to the stage of implementation. For example, during the construction phase there may be specific health and other social risks due to an influx of migrant workers living in temporary and unsanitary accommodation. Later, once the project has been operating for several years, cumulative impacts may cause serious adverse environmental impacts. Increase in land values due to the installation of irrigation systems may affect the social structure and relative wealth of the local inhabitants.

Table 3.5. Potential adverse impacts and mitigation actions for irrigation systems infrastructure construction and extension

Potential Adverse Impacts	Avoidance/Mitigation Measures
Direct	
Increased erosion, soil compaction, slopes, ground contamination, and disturbance of geological strata during construction.	Plan project design and implementation to minimize soil movement, especially during the rainy season.
Degradation of natural groundwater and surface water systems.	Operate dams to suit downstream requirements and encourage wildlife around reservoirs. Designate land for flood plains, wetlands, watersheds, drainage water disposal, river corridors. Define and enforce regulations governing extraction of gravel and sand.
Indirect	
Salinization, alkalinization, water logging and soil acidification. Soil contamination from agrochemicals and soil salinization. Water quality problems for downstream users caused by irrigation return flow quality. Changes to natural ecosystems due to altered watershed hydrology, vegetation and soil stability resulting in reduced biodiversity.	Provide drainage including disposal of water to evaporation ponds if quality of river flow adversely affected by drainage water. Maintain channels to prevent seepage, and reduce inefficiencies resulting from siltation and weeds. Allow for access to channels for maintenance in design. Improve I & D operations to match demand. Provide water for leaching as a specific operation. Set up or adjust irrigation management infrastructure to ensure sufficient income to maintain both the irrigation and drainage systems. Analyze soils and monitor changes so that potential problems can be managed. Define and enforce return water quality levels (including monitoring).
Ground water depletion. Dry drinking and irrigation wells	Designate land for saline water disposal; build separate disposal channels.
Increased spread of diseases due to influx of migrant workers. Increase incidence of water related disease.	Monitor groundwater wells. Monitor irrigation water quality.
Increased inequity. Weaker community cohesion. Social and cultural changes and loss of traditional farming methods. Changes to population structure and pressures on the local community, infrastructure, sanitation and water supply.	Educate for pesticide or sewage contamination dangers. Prevent disease spread by better management of I & D. Educate about causes of disease. Improved health facilities. Allow sufficient time and money for public participation to ensure that plans are optimal, that all sections of affected society are considered and that local institutions are in place, particularly regarding land and water rights. Ensure that agricultural intensification does not preclude other economic activities. Consider markets, financial services and agricultural extension in conjunction with IS and drainage changes. Provide short-term support/skills for an alternative livelihood if irrigation removes existing livelihood.

Source: PEA Team and World Bank (1991)

Specific Environmental Issues

The Saposoa case study raised several specific environmental issues connected with irrigation projects.[8] A number of the intended beneficiaries of the irrigation project had sold their land and moved to other areas. One informant said that these people had moved into the upper watershed of the Saposoa River. If this did happen, it is possible that the construction of the irrigation system stimulated colonization and therefore deforestation of the upper watershed that provides water to the irrigation system itself. The Saposoa Irrigation Project was originally undertaken without an environmental assessment of any kind. One consequence was that its main diversion structure was not designed to withstand the peak flows in the Saposoa River. Consequently, during the first rainy season after its construction, the flooded river washed most of the structure away. To rebuild the structure cost approximately US$500,000. The present structure appeared to the PEA Team to present a serious risk to downstream agricultural lands. The intake structure is placed at a bend in the Saposoa River, which receives the full force of the river. Furthermore it does not have a regulatory mechanism to control the intake of irrigation water. For both these reasons, it appears that the river could break through the intake structure and flood the principal irrigation canal. If that were to happen flood waters would race down the principal irrigation structure probably destroying secondary canals and some proportion of the agricultural fields to which they convey water.

Like the Saposoa Irrigation Project, presumably future irrigation systems will be constructed on the more fertile alluvial soil in the valley bottoms, mostly below 500 meters above sea level, not on the hillsides. Little coca, however, is still grown on such soils. The documents made available to the PEA Team do not reconcile the construction or improvement of irrigation systems on fertile valley bottoms with the policy of using project resources to reward the eradication of coca by the farmers themselves.

The Environmental Assessment does not identify these issues or recommend appropriate avoidance or mitigation measures for them. It focuses almost entirely on the direct negative impacts and its mitigation measures are limited to re-vegetation of bare slopes.

Summary Potential Environmental Impacts of Small-Scale Irrigation Projects

Irrigation projects are likely to be second only to road projects in their potential for negative direct and indirect environmental impacts. Irrigation projects often require changes in water flows in ways that affect aquatic organisms. The constancy of their water supplies frequently depends on the adequate maintenance of vegetative cover on upstream watersheds. Irrigation projects require that particular attention be given to assuring that their financial benefits actually flow to the intended beneficiary populations.

[8] Note that USAID has financed only one secondary canal in the Saposoa Irrigation Project and only provided financing in 2002. Nonetheless, the project provided a good case study for the PEA Team of the potential negative impacts of such irrigation projects.

3.6 Small-scale Electrification Systems

Summary of Proposed Actions

The Expanded ADP will finance the installation of small-scale hydropower or diesel electric generating systems and their associated distribution networks. The quantity, characteristics and location of these small-scale electrification systems, however, remains to be determined based on discussions and negotiations with local and regional governments.

Potential Negative Environmental Impacts and Avoidance/Mitigation Measures

Direct Negative Impacts

The construction of hydropower installations causes direct negative environmental impacts on aquatic organisms through sedimentation and changes in water flow regimes. Dams create reservoirs that may flood forested areas destroying their biological diversity. Dams also may block the upstream migration of aquatic organisms to spawning locations.

Operation of hydroelectric plants may require changes in downstream water flows that affect aquatic organisms. Reservoirs may emit carbon dioxide and methane as a result of the decomposition of biomes. The scale of such emissions depends on variables such as latitude, altitude, water temperature, size, depth, depth of turbine intakes, dam operations, and construction procedures. Additional greenhouse gases are also emitted in the process of making cement for dam construction.

The construction of diesel electrical generation plants may cause the negative direct environmental impacts associated with construction projects. These include soil, surface water and groundwater contamination from oil and other fossil fuel spills and soil disruption and erosion. The negative impacts of construction can be minimized or avoided by the selection of sites where extensive soil movement or elimination of vegetation is not required. Proper fueling procedures and construction of spill containment structures to store fuels and house equipment can reduce the potential for oil and fuel contamination of soil and water bodies. Negative impacts from the operation of the facilities can be avoided or mitigated by the establishment and enforcement of regulations for the disposal of waste oils, waste solid and liquid materials.

Indirect Negative Impacts

Small-scale hydroelectric plants may involve the construction of diversion structures or dams. Depending on their size and design these may block water flows and affect aquatic organisms.

Table 3.6. Potential adverse impacts and mitigative actions for small-scale electrification systems construction, improvements and extensions

Potential Adverse Impacts	Avoidance/Mitigation Measures
Direct	
Construction of generation plants and extension of electricity lines disturb soil layers causing erosion. Sediment carried into receiving water bodies by runoff alter local flow regimes and impact water bodies quality.	Plan construction to minimize soil movement. Re-vegetate bare soil with appropriate vegetation.
During construction, airborne dust increased causing air pollution.	Construction during dry season, speedy and well-coordinated construction schedule to minimize loose earth.
Soil and water contamination from fossil fuels, oil from generators, batteries, grease, tires, trash and human waste	Prepare and enforce waste disposal guidelines and procedures including service of equipment in designated sites, provision and use of adequate containment and spill response equipment.
Indirect	
Erosion risks after construction completion.	Replace vegetation removed during construction as soon as possible. Plant rapid growing grasses on areas where soil is exposed to erosion.
3.6.1.1.1 Location of power line extensions can result in need to cut existing trees.	Power lines should be laid in paths that avoid larger, older trees. Implement a tree replacement and plantation program.

Source: PEA Team and World Bank (1991)

Specific Environmental Issues

The PEA Team identified no specific environmental issues connected with the construction of small-scale electrification systems.

Summary of Potential Environmental Impacts of Electrification Projects

The negative direct and indirect negative environmental impacts of electrification projects will generally be limited in intensity, time, and geographic scope. They can be avoided or mitigated through standard practices. The positive environmental benefits from electrification are likely to be significantly large and long-term.

3.7 Agricultural Extension and Information Services

Summary of the Proposed Actions

The Expanded ADP will provide agricultural extension and information services to both poorer farmers and to better-off farmers. The poorer farmers produce crops and livestock for both cash and home consumption. The better off farmers tend to produce mostly for the market. Under the Expanded ADP approximately 50,000 families will benefit from extension services. These will include demonstration plots and information oriented to proper techniques to control soil erosion,

the use of trees for crops requiring shade, composting as a natural fertilizer, pest management by proper spacing and pruning and simple processing techniques that avoid contamination of water supplies. Information will be provided to farm families about market opportunities and about the environmental damage caused by coca leaf production and processing.

Potential Negative Environmental Impacts and Avoidance/Mitigation Measures

Direct Negative Impacts

Agricultural activities in the Expanded ADP area fall into two general categories: agriculture in the valley bottoms, often using irrigation, and rain fed agriculture at higher elevations. Each type of agriculture has its own type of potential agricultural impacts. In the flat, lowland, irrigated agriculture the potential impacts largely stem from the use of irrigation and agrochemicals. In rain fed agriculture, the environmental problems concern soil erosion, loss of soil fertility, watershed degradation, and deforestation. In both situations, however, good agricultural practices can reduce or eliminate the negative impacts of agriculture and increase productivity. The extension and information services that the Expanded ADP will provide would promote better use of land, forest and water resources as well as technologies, such as composting, control of soil erosion and use of trees for shade, which would protect the environment.

The Expanded ADP might stimulate agricultural and livestock production without concurrent adoption of production technologies that would protect the environment. Thus the stimulus of an increased market demand might be met through an expansion in the area under production rather than through intensification of production using improved technologies. The expanded area of production might come from the elimination of conversion of natural vegetation, including primary tropical forests, agricultural use or from increased use of agricultural chemicals without concomitant environmental protection measures.

Indirect Negative Impacts

If the agricultural extension and information services were to be successful in increasing the demand for an agricultural product, without concurrently promoting on-farm conservation technologies, then indirect negative impacts could result. The promotion of coffee or cacao cultivation, for example, without concurrent protection of remaining forest areas could promote deforestation in order to expand the area under production of these crops.

Table 3.7. Potential adverse impacts and mitigative actions for agricultural extension and information services

Potential Adverse Impacts	Avoidance/Mitigation Measures
Direct	
Environmental degradation (soil erosion and compaction, soil and water contamination with chemicals) due to the intensive, monoculture crop production.	Adopt environmentally sound crop production practices, including agroforestry and minimize the use of toxic agrochemicals.
Farming in ecological unsuitable areas without soil conservation practices.	Promote crop production on the basis of crop requirements and land suitability and land conservation practices.
Loss of soil fertility and structure.	Promote use of organic fertilizers (compost, humus, manure) and the rotation or interplanting of principal crops with legumes.
Soil erosion due to removal of protective organic material from soil surface as forests are cleared.	Avoid clearing of vegetation during the rainy season and promote a rational forest clearing policy that prohibits clearing of legally defined protective forests.
Erosion risks increase after crop harvest.	Promote agricultural systems that keep ground covered with vegetation and harvest during the dry season.
Indirect	
Increase in market demand stimulates clearing of natural forest in order to convert land use to agriculture and pasture.	Promote policies that stimulate intensification of agricultural production on the most suitable soils rather than expansion of area under agricultural production at the expense of natural vegetation.
Expansion of agroindustry causes increased contamination of water bodies with processing wastes.	Promote processing systems that minimize production of toxic wastes, control discharge of toxic wastes into water bodies, and stimulate use of waste products for improvement of agricultural soils, energy, feed products, or other commercial uses.

Source: 1994 PEA for AD, PEA Team and World Bank (1991)

Specific Environmental Issues

DEVIDA, USAID and Chemonics give considerable attention to the possibilities of large-scale production of agricultural crops in the valley bottoms of the Central and Upper Huallaga Valleys such as sugar cane, rubber and African oil palm. The Expanded ADP's IEE, however, does not specifically mention these crops, since their promotion will be financed under the PRA project.

Yet the conversion of large areas of valley bottom lands has the potential to cause significant negative social and environmental impacts. For example, the present owners of the land could be forced to migrate. The benefits of irrigation systems constructed with funds from the ADP and Expanded ADP could flow to well-off farmers who have capital to invest in and operate large-scale agricultural operations rather than to the intended poor beneficiaries. The relatively small areas of natural vegetation that remain in the valley bottoms could be reduced. The use of agrochemicals could increase.

The cultivation of monocultures of such crops as cotton, African palm, rice and sugar cane frequently requires the use of agrochemicals, such as fertilizers and pesticides. USAID Regulation 216 specifies that if USAID funds are to be used to purchase or promote the use of pesticides a separate pesticide Environmental Assessment must be prepared.

Summary of Potential Environmental Impacts of Agricultural Extension and Information Services

The agricultural extension and information services to be provided by the Expanded ADP will be more likely to result in positive than in negative environmental impacts. The services themselves will provide farmers with information and techniques that will improve their agricultural productivity while conserving the environment on their properties. Increased productivity on the better agricultural soils in the valley bottoms will decrease pressure to produce agricultural crops on the poorer soils at higher elevations and steeper slopes, where soil erosion and deforestation is more likely to occur. The potential negative impacts of farming and livestock production can be avoided or mitigated through proper technical practices. A Pesticide Environmental Assessment would define the specific mitigation measures for actions that the Expanded ADP might take that would finance or promote the use of pesticides.

3.8 Roads for Markets Initiative

Summary of the Proposed Actions

The Roads for Markets Initiative consists of the rehabilitation of the 174 km section of the Fernando Belaunde Marginal Highway between the towns of Juanjui and Tocache in the Central Huallaga Valley. The rehabilitation work does not involve the construction of new road sections. It involves widening and resurfacing with gravel the existing road surface, reconstructing and constructing culverts and other drainage structures, and reducing the radius of some curves. Through an U.S. Government interagency agreement, USAID/Peru has given responsibility for managing the award and supervision of the contract for the rehabilitation of the road to the U.S. Army Corps of Engineers (USACE).

Potential Negative Environmental Impacts and Avoidance/Mitigation Measures

Direct Negative Impacts

The direct negative impacts associated with the type of road rehabilitation proposed for the Juanjui-Tocache road are the same as those for the smaller secondary and tertiary roads discussed previously. They mostly concern elimination of natural vegetation, and movement of soil. These actions have the potential to reduce the numbers and variety of plant and animals and contaminate water bodies with sediments. On specific sites earth movement may initiate landslides. In addition, during the construction phase, the operation of heavy machinery may cause air and noise pollution and create safety hazards for humans. Once the road is completed its use creates additional safety hazards for both people and wildlife.

Indirect Negative Impacts

The indirect negative impacts associated with the rehabilitation of a principal highway such as the Juanjui-Tocache section of the Marginal Highway involve increased movement of people into a heavily forested area as a result of less expensive and difficult access. As the population increases the demand for secondary roads also increase. Additional agricultural colonists then often follow the new or improved roads into areas covered with natural forest. They remove forest cover in order to create areas for agricultural production. In some areas this process of may stimulate movement of agricultural colonists into protected areas where they eliminate forest in order to carry out agricultural and livestock production activities. The elimination of natural forest may reduce the number and variety of plant and animal species.

Table 3.8. Potential adverse impacts and avoidance/mitigation actions for the road to market road rehabilitation

Potential Adverse Impacts	Avoidance/Mitigation Measures
Direct	
Soil erosion from talus slopes and earth movement causes sedimentation into water bodies altering water flow regimes and quality	Plan construction to minimize soil movement. Avoid construction during rains. Specify appropriate equipment to permit deposit of material on appropriate dump sites. Cut talus slopes to appropriate angle of repose. Revegetate bare soil with appropriate vegetation. Design, construct and maintain effective drainage systems.
During construction, sediment carried into receiving water bodies by runoff alters water local flow regimes	Construction during dry season, speedy and well-coordinated construction schedule to minimize loose earth.
Soil and water contamination from oil, batteries, grease, tires, trash and human waste.	Design and implement appropriate waste disposal procedures including service of equipment in designated sites, provision and use of adequate equipment.
Indirect	
Deforestation as a result of uncontrolled colonization causes loss of biological diversity and soil erosion.	Assign clear and enforceable use rights to forested areas and stimulate markets for forest products.
Construction of bridges across large rivers may open forest areas to road penetration and colonization, stimulating deforestation.	Increase flow of benefits from forests to local inhabitants. Land use controls through the establishment of forest management units that provide benefits to local populations.

Specific Environmental Issues

The Juanjui-Tocache section of the Marginal Highway passes through a mountainous area with high rainfall and many rivers and streams that is largely covered with primary and secondary natural forest and which lies close to the boundaries of the Cordillera Azul and the Río Abiseo National Parks. The road rehabilitation project thus has potential to cause significant negative direct and indirect impacts on natural forests, biological diversity, water quality, and aquatic organisms. The principal mitigation measures for the direct negative environmental impacts involve the application of standard good design and engineering practices. The mitigation measures for the indirect negative environmental impacts involve systematic land use planning in

the 5 municipalities through which the road passes and the creation and management of productive and protection forests under the control of the local people.

Summary of Potential Environmental Impacts of the Roads-to-Markets Initiative

The roads-to-markets initiative has the potential to cause significant direct and indirect negative impacts on natural forests and water bodies and therefore on biological diversity and water quality. These potential negative impacts, however, can be mitigated through the application of standard good engineering practices and land use policies and controls. USAID has prepared an Environmental Assessment for the road to market initiative that the Bureau Environmental Officer has found to establish adequate mitigation measures for the direct and negative impacts and has contracted a capable institution, the U.S. Army Corps of Engineers, to oversee compliance with these mitigation measures.

SECTION IV

4 Analysis of the Effectiveness of the Environmental Process for the Alternative Development Program, 1995 - 2002

The purpose of Section 4 is to establish an empirical basis for the design of an Environmental Process for the Expanded Alternative Development Program. The chapter first briefly describes how the Alternative Development Project dealt with environmental review from 1994 to 2002. Next it identifies and analyses fourteen weak points in the Alternative Development Project's environmental review process. On the basis of these weaknesses, the chapter formulates fifteen recommendations for the functioning of an effective Environmental Process for the Expanded ADP.

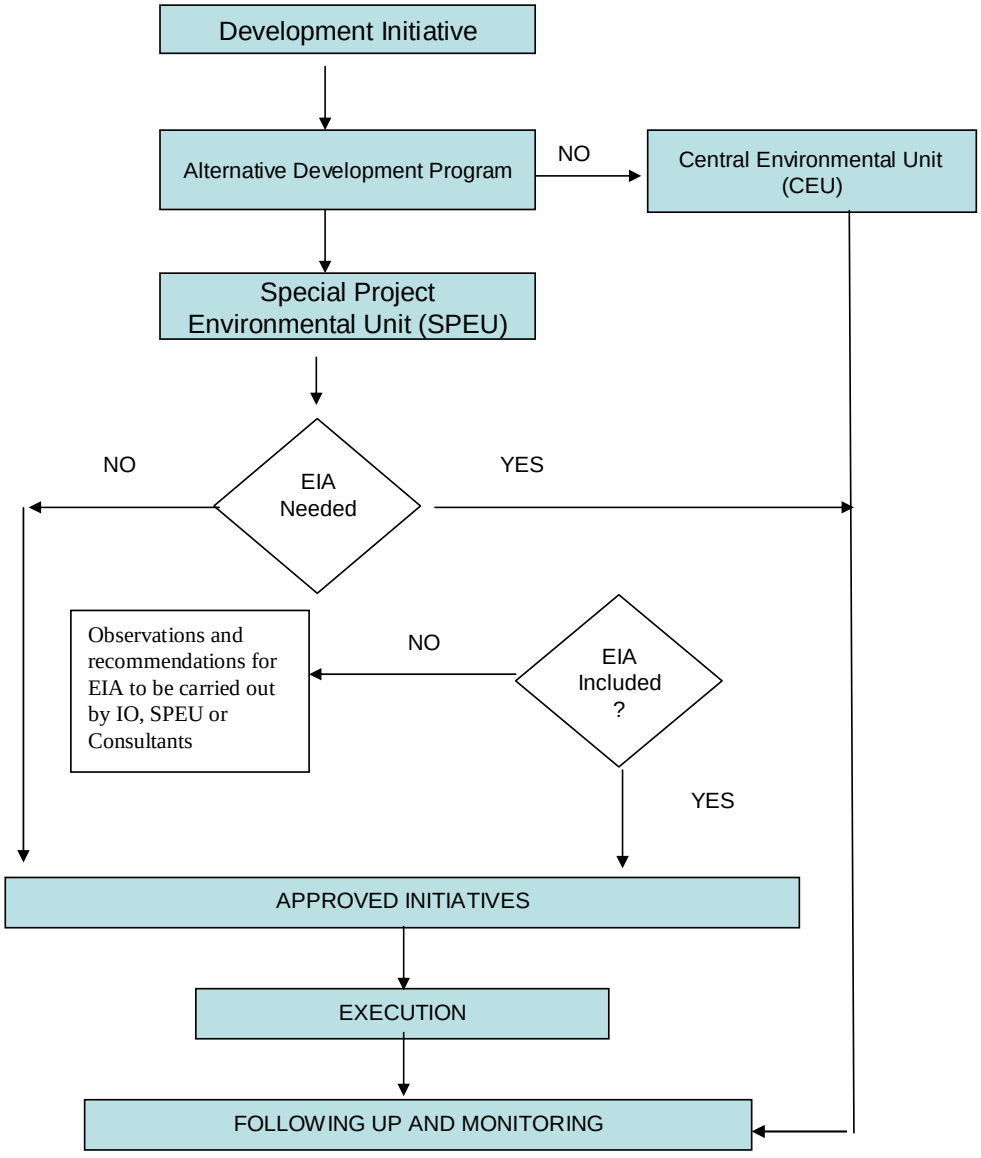
4.1 The Alternative Development Program Environmental Process

A Programmatic Environmental Assessment (PEA) was prepared in 1994 for the Alternative Development Project and approved by the Bureau Environmental Officer. The 1994 PEA recommended the environmental evaluation and monitoring process shown in Figure 4.2. A Central Environmental Unit (CEU), based in Lima within the National Development Institute (INADE), was to supervise the operation of the environmental review and monitoring process. Special Project Environmental Units (SPEU) were to be established within the regional Special Projects.

In 1998 the Government of Peru established ContraDrogas and it became USAID/Peru's counterpart agency for the Alternative Development Program. ContraDrogas took over the administration of the Alternative Development Program´s environmental review and monitoring process. It called this process the System for Environmental Impact Analysis (SEIA). The SEIA was based on the requirements contained in the 1994 PEA and the Central Environmental Unit and the Special Project Environmental Units continued to operate. The former, however, became part of ContraDrogas and the latter remained in the Special Projects.

In 2002, ContraDrogas was renamed the National Commission for Development and Life without Drugs (DEVIDA). The former Central Environmental Unit of ContraDrogas was raised in status to become one of DEVIDA´s four divisions or "Gerencias". Its full name is the "Gerencia for Environmental Conservation and Recuperation of Degraded Ecosystems but it is generally referred to as the "*Gerencia Medio Ambiental*" (GMA). In early 2003, the GMA prepared a new Manual of Operations (MOP) and Guidelines 1 and 2 within the Environmental System for Environmental Assessments (SEIA).

Figure 4.1. Environmental Review, Mitigation, and Monitoring Process Recommended by the 1994 Programmatic Environmental Assessment



4.2 Analysis of the Alternative Development Program Environmental Process

The Terms of Reference for this PEA require it to design an effective process for identifying and mitigating the negative environmental impacts that the actions to be undertaken with Expanded Alternative Development Program funds could cause. The Expanded Alternative Development Program will finance the same or similar types of actions as did the former Alternative Development Program. Thus the PEA could analyze the effectiveness of the former Alternative Development Program in identifying and mitigating negative environmental impacts. Based on the weaknesses in the process used by the Alternative Development Program, it could design a more effective environmental review and monitoring process for the actions to be financed by the Expanded Alternative Development Program.

Using this methodology, the PEA identifies fifteen weak points in the Alternative Development's environmental process that limited its effectiveness. It then formulates fifteen recommendations for the Expanded Alternative Development Program environmental review and monitoring process to function effectively and therefore fully comply with the letter and spirit of USAID Environmental Regulations and FAA 118 and 119.

4.2.1 Financial Support for the Environmental Review Process

Inadequate financial support for the environmental review process under the Alternative Development Program reduced its effectiveness in assuring its compliance with USAID Environmental Regulations. Since 1995, the Alternative Development Project has under-funded the environmental review process, thus restricting its scope and effectiveness. In 1995, for example, the USAID Regional Environmental Advisor for South America estimated that the effective operation of the Central Environmental Unit and the Special Project Environmental Units would require approximately US$1.2 million over the period 1996-99. In fact, the actual budget the Alternative Development Project assigned for these units during that period was only US$437,000. The PEA Team noted in its case studies and field observations that the environmental process had not always been effective in analyzing and mitigating negative environmental impacts from infrastructure projects. DEVIDA´s central and field environmental staff confirmed that lack of adequate financing has hampered their ability to review the environmental impacts of the Alternative Development Programs field activities and to follow-up on required mitigation measures. Without adequate funding, the central and field environmental units have frequently been unable to make the regular field inspections that an effective, timely environmental review process requires.

Recommendation 1: Provide an adequate budget for the identification and assessment of environmental impacts and follow-up on environmental mitigation measures.

4.2.2 Financing of Environmental Conditions and Mitigation Measures

The Alternative Development Project frequently did not provide adequate funds for the implementation of environmental mitigation measures. Project implementers, such as the Special Development Projects, were frequently reluctant to include environmental impact mitigation measures within project budgets, claiming that they should be financed under separate environmental budgets. For example, although the DEVIDA environmental unit sometimes pointed out the need for additional drainage structures on roads, or sanitary and water systems for health posts and schools, these were not financed.[1] Similarly, the case study of the Humapaza-San Juan Road Project, as well as inspections of other roads, indicated that insufficient funds were frequently unavailable for the mitigation of the potential direct and indirect negative environmental impacts of road projects. [2]

Recommendation 2: Include adequate financing in project budgets to permit timely implementation of environmental mitigation measures.

4.2.3 Contracting Process for Infrastructure Projects

The Alternative Development Program utilized contracting procedures that contributed to the diversion of funds from environmental mitigation measures to other components of infrastructure project budgets. Although the Peruvian public contracting procedures set a referential budget for infrastructure projects, it requires that the contract be awarded to the lowest bidder. Consequently, contractors frequently submit bids that are lower than even the reference budget. Frequently they cannot finish the project with the funds in these low budgets. Consequently they sometimes seek to cut costs by shifting funds out of environmental line items into construction line items. [3]

Contracts may also cut costs by reducing construction standards. For example, a contractor may reduce the depth of road surface materials or reduce the number or quality of drainage structures. Such reductions in construction standards frequently result in more rapid deterioration of the infrastructure. Roads, for example, will erode more quickly with a lower quality surface or fewer drainage structures and such erosion can cause both direct and indirect negative environmental impacts.

Recommendation 3: Utilize contracting procedures that ensure adequate funds for implementation of environmental mitigation measures for infrastructure projects.

[1] This information comes from the GMA.
[2] In the United States, for example, construction projects typically assign from 5 to 10 percent of their budget to environmental mitigation measures, according to Ing. Victor Bustamante.
[3] This observation is based on interviews with several Peruvian civil engineers.

4.2.4 Lines of Administrative and Technical Authority

When the 1994 PEA was prepared, the Central Environmental Unit (CEU) and the Special Project Environmental Units (SPEU) were part of the same institution, the National Development Institute. The SPEUs, however, were under the direct control of the Executive Directors of the regional Special Projects. These directors tended to view the SPEUs as obstacles to the implementation of construction programs. Consequently, they tended to use their authority to restrict the SPEU´s ability to identify negative environmental impacts and enforce required mitigation measures. The CEU did not have sufficient direct authority over the SPEUs to counteract this tendency. When the CEU was separated from INADE, and became part of ContraDrogras, it lost even more control over the operations of the SPEUs, since these remained in the Special Projects of the National Development Institute.

In early 2003 the SPEUs were renamed Decentralized Environmental Units (UMADs) and removed from the Special Projects to be placed within DEVIDA's field offices. The situation is, therefore, now similar to that of 1994, with field environmental units again in the same institution as the central environmental unit. The UMADs are, however, located within DEVIDA´s regional offices. They could, therefore, come under the control of the regional DEVIDA director, as previously the SPEUs were under the control of the Executive Directors of the Special Projects. Regional directors may view the UMADs as interfering with their objective of rapid coca eradication. Their directors, therefore, may not fully support the operations of the UMADs.

In mid-2003, USAID/Peru adopted a policy of providing only limited funding for the contracting of DEVIDA staff. It does not, therefore, intend to finance the functioning of the UMADs. Rather the environmental supervision function will be financed through one of USAID's contractors. For the purposes of this PEA, these units are referred to as the Central Environmental Unit (CEU) and the Regional Environmental Unit (REU). The administrative arrangement, no matter its specifics, should ensure that the Central Environmental Unit maintains administrative and technical control over the Regional Environmental Unit. Otherwise, as happened from 1995 through 2002 in the previous ADP, the staff of the Regional Environmental Units will be required to respond to other interests that those of environmental impact identification and mitigation.

Recommendation 4: Establish direct lines of administrative and technical supervision between the Central Environmental Unit and the Regional Environmental Unit.

4.2.5 Retention and Training of Environmental Professionals

DEVIDA and its predecessor environmental units in the alternative development institutions have had difficulty retaining trained professional environmental staff. The Alternative Development Program financed training in the environmental review process for ContraDrogas´ field staff. Yet few of the trained professionals still remain in the UMADs. In early 2003, for example, most DEVIDA´s professional field staff had only a few months of experience.

Three factors contributed to rapid staff turnover. First, DEVIDA´s pay scale does not compete with private industry, especially because experience with the Alternative Development Program has helped environmental professionals to obtain better paying jobs in the private sector. Second, DEVIDA gives only short-term, three month contracts to its field staff, stimulating them to look for more permanent, stable positions. Finally, the Executive Directors of the Special Projects have been political appointees. They have used the field environmental positions for political patronage, so that professional staff has changed along with changes in the Executive Directors.

Since USAID/Peru policy now limits the number of environmental professionals which DEVIDA can hire with Expanded ADP funds, the staff of the central and regional environmental units will be selected and contracted by a contractor to USAID/Peru. This PEA recommends that the professional environmental staff (1) be dedicated to environmental review and follow-up as their principal activity so that they can be present at the correct times in the design, implementation and closeout of projects; (2) be selected based on professional training and experience in environmental fields, such as forestry and environmental engineering. The contractor should establish written selection criteria for the environmental staff. Their work should be regularly evaluated against predetermined criteria and their contracts should be renewed based on the results of this evaluation. Thorough training in the procedures of the Expanded ADP environmental review and mitigation process should be provided to the staff as a complement to their previous professional training and experience.

Recommendation 5. Ensure consistent, effective follow-up on the mitigation measures for significant negative environmental impacts through the contracting, training and retention of experienced, trained environmental professionals.

4.2.6 Inclusion of All Alternative Development Program Actions in the Environmental Process

The ADP environmental process did not include or cover all of the actions financed by the ADP program. USAID has sometimes financed Alternative Development Program activities directly, without utilizing the Alternative Development Program´s environmental review process. When USAID began to finance the activities of the Association of Municipalities of San Martin (AMRESAM) directly, for example, the Special Project Environmental Units were not involved. Consequently, in early 2003 the PEA Team could note little knowledge of the Alternative Development Program´s environmental process within AMRESAM. Likewise, using Alternative Development Program funds, USAID/Peru has made direct grants to the World Wildlife Fund (WWF), the Chicago Field Museum, and the Nature Conservancy (TNC). The activities to be implemented under these grants have not been reviewed under the Alternative Development Program's environmental process. Although presumably USAID/Peru has utilized other procedures to review the potential environmental impacts of the activities to be implemented under these direct grants, the existence of different procedures, and an unclear relationship between them, has detracted from the thoroughness and comprehensiveness of the Alternative Development Program´s environmental process and the credibility of DEVIDA's

environmental units. The possibility exists, moreover, that some Alternative Development Program activities have not been adequately reviewed by any environmental process.

Recommendation 6. All the institutional actors of the Expanded ADP must comply with the procedures and requisites indicated on this report.

4.2.7 Environmental Clauses in Contracts

The subcontracts through which the Alternative Development Program was implemented did not include specific contractual language that required effective assessment, mitigation and monitoring of potential negative environmental impacts. Contractors could thus carry out their contract without any penalties for causing negative environmental impacts. Without the force of appropriate legal language in each contract, DEVIDA, USAID and other institutions did not have much power to enforce the implementation of the environmental process.

Recommendation 7. Include legal obligations for environmental assessment, mitigation and monitoring in each contract or sub-agreement financed with Expanded Alternative Development Program funds.

4.2.8 Analysis of Indirect Negative Environmental Impacts

The Alternative Development Program environmental system did not provide for adequate evaluation and mitigation of indirect negative impacts. Yet the most irreversible, large-scale negative impacts from the Alternative Development Program have been indirect rather than direct. The 2002 *Study of the Impact on Natural Forests of the Road Improvement Program in the Alternative Development Valleys* and the *Tres Unidos Case Study*, for example, document the indirect negative impacts on tropical forests and biodiversity that have had the ADP´s road construction, rehabilitation, and improvement activities. These studies indicate that the ADP's environmental process did not identify these indirect negative impacts or provide for their mitigation.

Recommendation 8. Utilize a methodology that identifies, evaluates and mitigates indirect negative environmental impacts.

4.2.9 Integration of the Environmental Process with the Project Approval Process

The Alternative Development Program´s environmental process operated in parallel to rather than as an integral part of the ADP´s decision-making process. Under the ADP the environmental process was considered a regulatory requirement rather as an integral contribution to the decision-making process. The Saposoa Irrigation Project and the Humapaza-San Juan Road Project Case Studies, for example, indicate environmental assessment these projects were prepared separately and subsequent to the project design and approval process. Decision-

makers evidently choose, designed, and implemented projects under the ADP without giving adequate consideration to their potential negative environmental impacts or possible mitigation measures. A number of interviewees gave the PEA Team the impression that the System for Environmental Impact Analysis (SEIA), when implemented at all, has been a paperwork exercise, viewed as having little or no practical value. USAID Environmental Regulations, by contrast, intend an environmental review and mitigation process to be an integral part of project planning and approval procedures.

Recommendation 9: Include environmental considerations in each step in the project selection and implementation process.

4.2.10 Public Participation in the Environmental Process

Adequate review of the potential environmental impacts of proposed actions requires public participation in a scoping process. Public participation in the preparation and review of EIAs serves to insert local knowledge into the project planning and design process. Such knowledge can contribute to identifying and mitigating negative environmental impacts. The Alternative Development Program's SEIA design and operation did not, however, provide for public participation in the identification of potential negative environmental impacts of proposed actions and mitigation measures. The Saposoa Irrigation and Tres Unidos Case Studies, for example, indicated that the environmental issues were identified without systematic consultation with affected or interested people.

Recommendation 10: Utilize a methodology that provides for public participation in the process for environmental impact identification and mitigation.

4.2.11 Separation of Significant from Non-Significant Issues

The Alternative Development Program's environmental process relied on numerical ratings of all potential impacts on the physical and social environment. Such numerical ratings do not necessarily distinguish significant negative impacts from non-significant impacts. For example, in the SEIA actions with significant environmental issues may be given a numerical rating less than 25. Consequently, the action would need only an "Environmental Declaration," rather than an environmental assessment. USAID Environmental Regulations require the separation of significant from non-significant environmental issues and the identification and implementation of mitigation measures for significant negative environmental impacts.

Recommendation 11. Establish an environmental impact methodology that clearly separates significant from non-significant environmental issues.

4.2.12 Mitigation for Negative Environmental Impacts of Coca Eradication

Coca cultivation in Peru has caused severe, irreversible, wide-spread direct and indirect negative environmental impacts. The eradication of coca cultivation, if accompanied by effective control on new coca plantations, will, therefore, remove a major source of environmental degradation in Peru.

On some sites (steep slopes), coca eradication will, however, cause negative direct and indirect negative environmental impacts. Especially where coca has been planted at high densities, so that there is no other vegetation, its eradication will expose soil to water erosion, not only reducing the site's productivity, but causing sedimentation in aquatic ecosystems and threats from landslides to infrastructure. The Alternative Development Program did not tie its assistance to coca eradication agreements; for that reason its environmental process did not take identify measures to mitigate the negative impacts of coca eradication.

The Expanded Alternative Development Program, by contrast, makes its infrastructure and technical assistance activities directly dependent on coca eradication on specific sites in rural communities. There is, therefore, a direct connection between its actions and the negative environmental impacts caused by coca eradication, making such impacts a significant environmental issue for the ADP that requires effective mitigation.

Recommendation 12: In close collaboration with the farmers, who have voluntarily eradicated their coca, reforest farms that include sites degraded by coca production.

4.2.13 Continuous Improvement in the Environmental Process

The ADP's environmental process did not include a process for continuous improvement in its effectiveness. The 1994 PEA did not specifically provide for feedback of information in order to improve the environmental process; nor did subsequent revisions to the process. The GMA, for example, recently designed and installed a computerized tracking system for the environmental process. But it does not include provision for evaluation and feedback of the results of the mitigation measures. Likewise, although the GMA has contracted yearly, external reviews of the environmental process, their conclusions and recommendations have not been utilized to improve the environmental system. Without such continual improvement, the ADP environmental process has not identified and applied lessons based on its own experience. It has not, therefore, improved and become more effective.

Recommendation 13: Establish a process for continual improvement in the effectiveness of the environmental review and mitigation process.

4.2.14 Identification and Mitigation of Negative Environmental Impacts

The Alternative Development Program's environmental process did not distinguish between monitoring of environmental parameters, such as air and water quality, from follow-up on required environmental mitigation measures. The Expanded ADP environmental process will not have sufficient funds to monitor the former. Nor is such monitoring its responsibility. Rather the experience of the ADP's environmental process indicates that DEVIDA's GMA and UMADs should focus their limited resources on identifying and assuring implementation of Environmental Conditions and Environmental Mitigation Measures for projects financed with Expanded ADP funds.

Recommendation 14: Focus the Environmental Process on identification and compliance with Environmental Conditions and Environmental Mitigation Measures.

4.2.15 2003 Project Approval and Implementation

The Expanded ADP started in April 2003 and has moved rapidly to plan and implement projects in collaboration with numerous rural communities. Its environmental process, however, is not yet functioning. Few of these projects, therefore, have been submitted to an environmental review process. All of the Expanded ADP's project must be adequately reviewed for their negative environmental impacts, so these on-going existing projects cannot be ignored. It would be advisable, therefore, to devise a procedure by which the Expanded ADP can put itself up-to-date in the environmental review of these on-going projects. Otherwise, the Expanded ADP's environmental review process will never achieve its goal of thoroughly evaluating and mitigating the negative environmental impacts of its actions.

Recommendation 15: Evaluate and mitigate the potential negative environmental impacts of the projects that the Expanded ADP has already undertaken during 2003.

SECTION V

5 An Environmental Process for the Expanded Alternative Development Program

Section 5 defines an institutional structure and process for the Expanded Alternative Program to comply with the requirements of USAID Environmental Regulations and Sections 118 and 119 of the Foreign Assistance Act and the recommendations developed in Section 4 of this PEA. This process is referred to as the Expanded ADP Environmental Process or simply as the Environmental Process.

Section 5 first defines an institutional framework for the Environmental Process, including the roles and responsibilities of the involved institutions. Second, it describes the sub-processes of the Environmental Process, including their objectives and steps. Third, the section outlines a training program for the environmental professionals who will operate the Environmental Process. Finally, the section presents a five year budget for the Environmental Process.

5.1 Institutional Framework for the Environmental Process

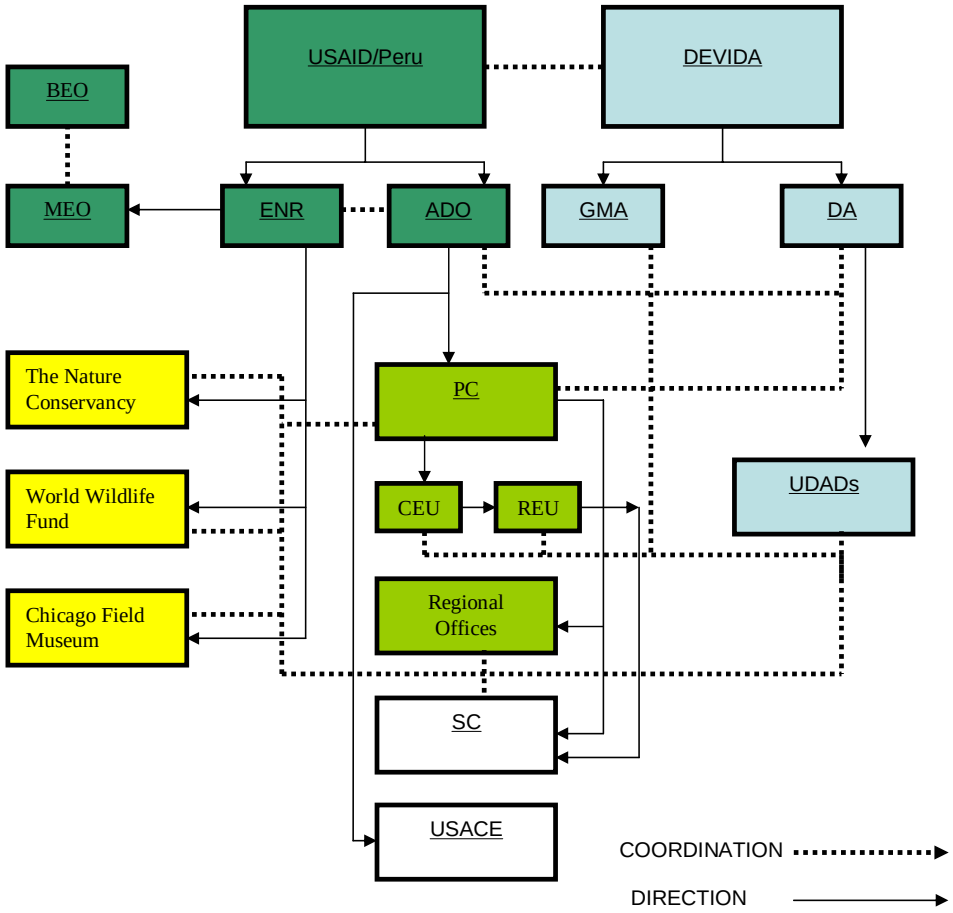
The Environmental Process for the Expanded ADP involves five institutions and groups of institutions. These are DEVIDA, USAID, the Principal Contractor, International Environmental Organizations, and Project Proponents (Local Governments and Rural Communities). Each of these has roles and responsibilities within the Environmental Process. Figure 5.1 indicates the direction and coordination relationships between these institutions. The following sections describe their roles and responsibilities.

5.1.1 National Commission for Development and Life without Drugs (DEVIDA)

Executive President

- Include environmental considerations within the National Policy and Strategy against Drugs.
- Ensure adequate coordination between DEVIDA's divisions to permit the effective functioning of the Environmental Process

Figure 5.1. Institutional Actors Environmental Process Expanded ADP



ADO Office of Alternative Development
BEO Bureau Environment Officer
CEU Central Environmental Unit
REU Regional Environmental Unit
DA Gerencia Desarrollo Alternativo
DEVIDA National Commission for Development and Life without Drugs
ENR Environmental & Natural Resources
GMA Gerencia Medio Ambiental
MEO Mission Environmental Officer
PC Principal Contractor
SC Sub-contractors
UDAD Desarrollo Alternativo Decentralized Offices
USACE U.S Army Corps of Engineers
USAID U.S. Agency for International Development/Peru

Division of Environmental Conservation and Recuperation of Degraded Ecosystems (GMA)

- Provide overall coordination for the Expanded ADP's Environmental Process
- Ensure compliance with Peruvian environmental regulations.
- Review and approve the Terms of Reference for Environmental Evaluations.
- Review and approve Environmental Evaluations.
- Maintain the Environmental Data Base for the Expanded ADP.
- Maintain the Peruvian Sector institutions informed of the results of the Environmental Process.

Alternative Development Division

- Instruct the Alternative Development Decentralized Offices to comply strictly with the rules and regulations established by the Environmental Process.
- Assure that all proposed projects have an Initial Environmental Examination (IEE) as one element of their approval process.
- Provide required information on all projects approved by the Alternative Development Decentralized Offices to the REU and the GMA.
- Assure that projects are not approved before the GMA has approved the corresponding IEE.
- When an Environmental Assessment is required for a project, ensure that funds are not expended and work is not started until the GMA and USAID have approved the Environmental Evaluation and the conditions exist for its mitigation measures to be implemented.
- Ensure that each Global Agreement with communities contains a clause that refers to commitments by the community to identify and mitigate negative environmental impacts that could result from approved projects and that the communities understand this commitment.
- Ensure that all contracts for implementation of projects with rural communities contain a clause that refers to the requirement for implementing Environmental Conditions or Environmental Mitigation Measures that have been identified in the IEE or in the Environmental Assessment (EA).

Administration and Information Division

- Support the Environmental Process by administering efficiently and opportunely the funds provided to DEVIDA.
- Provide for the opportune purchase of required equipment and materials for the operations of the GMA.
- Transfer funds provided by the GOP and the Expanded ADP opportunely to the GMA.

Alternative Development Decentralized Offices (UDADs)

- Include explanation of environmental commitments in meetings with communities and local governments.
- Provide the REU opportunely with information required for preparation of IEEs.

- Ensure that project budgets include sufficient funds for implementation of Environmental Conditions and Environmental Mitigation Measures.

5.1.2 United States Agency for International Development/Peru (USAID/Peru)

Mission Director

- Ensure that the Expanded ADP complies with USAID Environmental Regulations and with Articles 118 and 119 of the Foreign Assistance Act.
- Establish policies and procedures that permit the effective functioning of the Expanded ADP Environmental Process.

USAID/Peru Office of Alternative Development (ADO)

- Ensure compliance with USAID Environmental Regulations and FAA Articles 118 and 119 in the implementation of the Expanded ADD.
- Coordinate actions with the Principal Contractor, DEVIDA/GMA and other institutions to ensure compliance with USAID Environmental Regulations and FAA 118 and 119.
- Review and approve or disapprove documents on the Environmental Process submitted to it by the Principal Contractor, DEVIDA and other institutions and transmit them as appropriate to the Mission Environmental Officer.
- Ensure that all contractors utilizing funds from the Expanded ADP understand and comply with the provisions of USAID Environmental Regulations.
- Supervise projects financed through the USAID Environment Office with funds from the Expanded ADP, such as the Joint Environmental Agenda projects.

USAID/Peru Office of the Environment (ENR)

- Administer the funds from the Expanded ADP that have been assigned to the JoinT Environmental Agenda.
- Ensure that all activities financed under the Joint Environmental Agenda fully comply with the provisions of USAID Environmental Regulations and the intent of FAA 118 and 119.
- Coordinate the activities under the Joint Environmental Agenda with the activities in other components of the Expanded ADP in order to ensure that these activities mitigate the negative environmental impacts of the Expanded ADP in the most effective manner possible.
- Review external evaluations of the activities implemented under the Joint Environmental Agenda

USAID/Peru Mission Environment Officer (MEO)

- Review draft Terms of Reference for Environmental Assessments before sending them to the Bureau Environmental Officer for approval.
- Review Environmental Assessments before sending them to the Bureau Environmental Officer for approval.

- Provide an annual evaluation to the Bureau Environmental Officer of Expanded ADP's compliance with USAID Environmental Regulations and FAA 118 and 119.

5.1.3 Latin America and Caribbean Bureau Environmental Officer

- Review and approve the Terms of Reference for Environmental Evaluations.
- Revise and approve Environmental Evaluations
- Review and approve the annual report presented by the Mission Environmental Officer regarding the Expanded ADP's compliance with USAID Environmental Regulations and FAA 118 and 119.

5.1.4 Principal Contractor

Central Environmental Unit (CEU)

- Provide technical support as required for the operation of the Environmental Process
- Ensure effective and complete application of USAID Environmental Regulations and FAA 118 and 119 to all its activities.
- Coordinate with the USAID/Peru Office of Alternative Development in the application of the Environmental Process.
- Administer the Expanded ADP funds assigned for the contracting of additional central and field environmental professionals.
- Administer the Expanded ADP funds assigned for the purchase of equipment and supplies for the operation of the Environmental Process.
- Incorporate the Environmental Process fully into its process for negotiating and selecting projects with rural communities.
- Prepare and utilize Generic or Model Terms of Reference for infrastructure projects that include environmental considerations.
- Prepare Terms of Reference for Environmental Assessments.
- Contract technical specialists or companies for the preparation of Environmental Assessments.
- Prepare Terms of Reference for specific studies required as part of the Environmental Process
- Contract a forest management certification institution to review annually a sample of the natural forest management activities financed with Expanded ADP funds.
- Prepare the draft Terms of Reference for the Pesticide Environmental Assessment.
- Prepare the Pesticide Environmental Assessment.
- Prepare an Ecological/Economic Zoning of the Expanded Alternative Development Program areas.
- Contract for training events required for the effective operation of the Environmental Process.
- Select and contract the personnel for the REU.

Regional Environmental Unit (REU)

- Make field environmental inspections at different stages of Expanded ADP projects
- Prepare Initial Environmental Evaluations (IEEs) for Expanded ADP projects
- Review draft Terms of Reference for Environmental Evaluations and provide written comments.
- Review draft Environmental Evaluations and provide written comments.
- Assure that all subcontracts contain clauses that specify the environmental obligations of the subcontractor.

Subcontractors

- Enforce the provisions of the environmental clause in their contracts.
- Contract Environmental Inspectors for construction projects
- Provide information on the design of projects to the REU as required to prepare the IEEs
- Implement the Environmental Conditions that are specified in the IEEs or Environmental Assessments.
- Provide to the REU information regarding compliance with the Environmental Conditions or Environmental Mitigation Measures.

5.1.5 International Environmental Organizations

- Apply the provisions and applicability of the Expanded ADP Environmental Process.
- Coordinate with the DEVIDA GMA, CEU and REU.
- Provide the CEU and REU with information required for preparation of IEEs and Environmental Assessments.
- Provide DEVIDA GMA with information for the Expanded ADP Environmental Data Base.
- Contract for an independent external evaluation of the environmental impacts of their activities and provide all required information and data for such evaluations.

5.1.6 Project Proponents (Local Governments and Rural Communities)

- Understand and make a formal commitment to the implementation of Environmental Conditions, Environmental Mitigation Measures and reforestation of degraded coca sites.
- Participate in the identification of potential negative environmental impacts of proposed projects.
- Participate in the identification of potential Environmental Conditions or Environmental Mitigation Measures for proposed projects.
- Participate in the implementation of Environmental Conditions and Environmental Mitigation Measures
- Commitment to the implementation of Environmental Conditions and Mitigation Measures required during the operational phase of a project after the construction phase is finished and the Expanded ADP is no longer involved in the community, district or region.

5.2 The Expanded Alternative Development Program Environmental Process

The Environmental Process for the Expanded Alternative Development Project involves the following thirteen Sub-Processes.

Sub-Process 1: Negotiation of Global Agreements with Environmental Clauses

Explanation of environmental commitments provide to communities during negotiation of Global Agreements. The Global Agreement with the rural community, producer association, district government, or regional government, will contain a specific clause referring to the commitments on both sides to implement the Environmental Process.

Sub-Process 2: Reforestation on Farms that have Eradicated Coca

During the negotiation of the Global Agreements the location and area of coca that the community or local government has committed itself to eradicate voluntarily will be established. Based on this information, the Principal Contractor will initiate a process for achieving the successful reforestation of a portion of the farms on which the coca has been eradicated.

Sub-Process 3: Technical Proposals for Projects

The REU ensures that environmental considerations are included in the Terms of Reference for the preparation of technical proposals. Project designs will, therefore, already include measures to avoid or mitigate potential negative direct or indirect environmental impacts. Adequate identification of potential negative environmental impacts will require that the Technical Proposal be prepared on the basis of a thorough knowledge of the project site(s), upon consultation with informed local people, and when applicable on the use of Model or Generic Terms of Reference.

Sub-Process 4: Preparation of Initial Environmental Assessments

Based on the Project Profile (Perfil del Proyecto) the REU carries out a field inspection and prepares an Initial Environmental Examination that makes a recommendation through the CEU to the Director of the DEVIDA GMA for the classification of the proposed project into one of three categories: a) Categorical Exclusion; b) Negative Determination; c) Positive Determination. The DEVIDA GMA accepts the recommendation and sends this recommendation to the CEU of the PC or rejects the recommendation and returns the IEE to the REU with specific requests for further explanation or justification of the recommendation or a change in the recommendation.

Sub-Process 5: Preparation of Environmental Assessment Terms of Reference

If GMA approves a Positive Determination, then the decision is communicated to the Principal Contractor who prepares the Terms of Reference for an Environmental Assessment. The Terms of Reference must be approved by the Bureau Environmental Officer and the GMA Director.

Sub-Process 6: Preparation of Environmental Assessment

The Principal Contractor either prepares the Environmental Assessment itself or contracts for its preparation. The Environmental Assessment must be approved by the USAID Bureau Environmental Officer and the GMA Director and must be sent to the Sector Ministry.

Sub-Process 7: Procedures for Pesticide Use

If the REU determines that all or part of a project will involve financing for or encouragement of the use of pesticides, then it will send an IEE to the GMA that will recommend that the project follow the procedures established in the Alternative Development Program's pesticide Environmental Assessment. Until a Pesticide Environmental Assessment has been approved by the BEO the Expanded ADP will not finance the purchase or recommend or promote in any way the use of pesticides.

Sub-Process 8: Natural Forest Management

When the Expanded Alternative Development Program funds are used to finance any aspect of natural forest management then an IEE will be prepared that recommends that the project follow a sub-process for natural forest management. In this sub-process, the Principal Contractor will make a contract with a forest management certification institution. The certification institution will not certify the natural forest management practices. It will, however, periodically compare the forest management practices against established international standards.

Sub-Process 9: Roads in Forested Areas

If the REU determines that a road rehabilitation, improvement or construction project will take place within the area that this PEA or subsequent studies carried out by the Principal Contractor have determined to be forested, then the IEE will recommend that the project follow the process for roads in forested areas.

Sub-Process 10: Follow-Up on Environmental Conditions and Mitigation Measures

Sub-Contractors for construction projects hire Environmental Inspectors to oversee compliance with Environmental Conditions and Environmental Mitigation Measures. The REU staff makes environmental inspections at the start, during implementation, and upon completion of each project that has received a classification of Negative Determination with Conditions or Positive Determination.

Sub-Process 11: Environmental Data Base

The GMA will maintain an Environmental Data Base, in which the recommendations of the approved IEEs, the required Environmental Conditions and Environmental Mitigation Measures, and the results of REU Environmental Inspections will be recorded. The Environmental Data Base will serve as the basis for the Quality Control and Reports Sub-Processes.

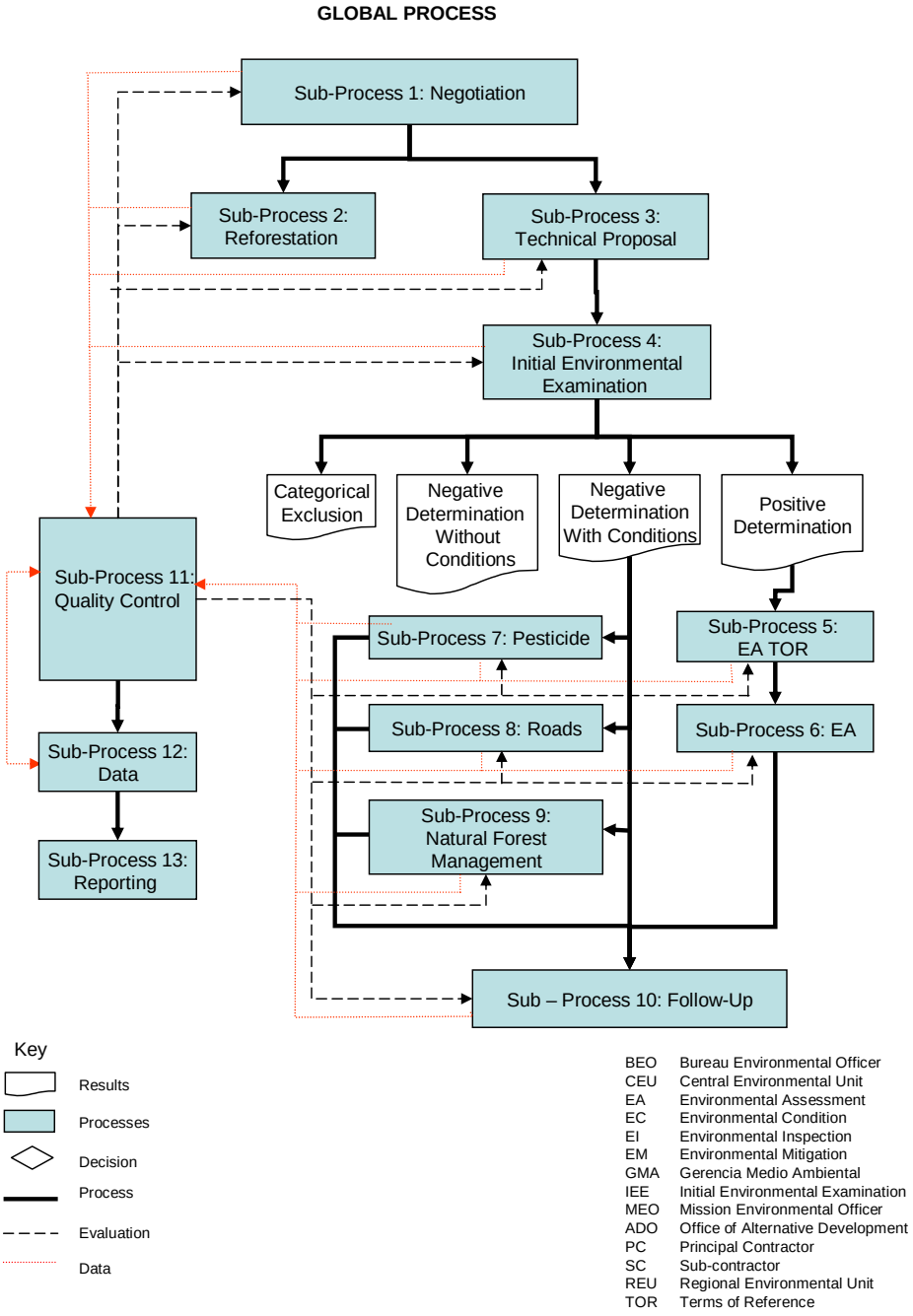
Sub-Process 12: Quality Control

The Principal Contractor will contract periodic external evaluations of the quality of the Environmental Process. The results of this evaluation will be discussed during a workshop with representatives of all the institutions involved in the operation of the Environmental Process. On the basis of this discuss specific measures will be agreed upon to improve the Environmental Process.

Sub-Process 13: Reporting

At specific steps in the Environmental Process the CEU and the GMA will prepare and submit to USAID/Peru reports on the operations of the Environmental Process.

Figure 5.2. Global Process



Sub-Process 1: Negotiation

(1) Communication of environmental requirements

The staff of the Regional Office of the Principal Contractor and the Decentralized Units for Alternative Development (UDADs) will include explanation of the environmental commitments that a community assumes when it participates in the Expanded ADP.

(2) Environmental issues

During the negotiation meetings the technical staff of the Regional Office of the Principal Contractor will identify, together with community and local government representatives, potential environmental issues related to the proposed project.

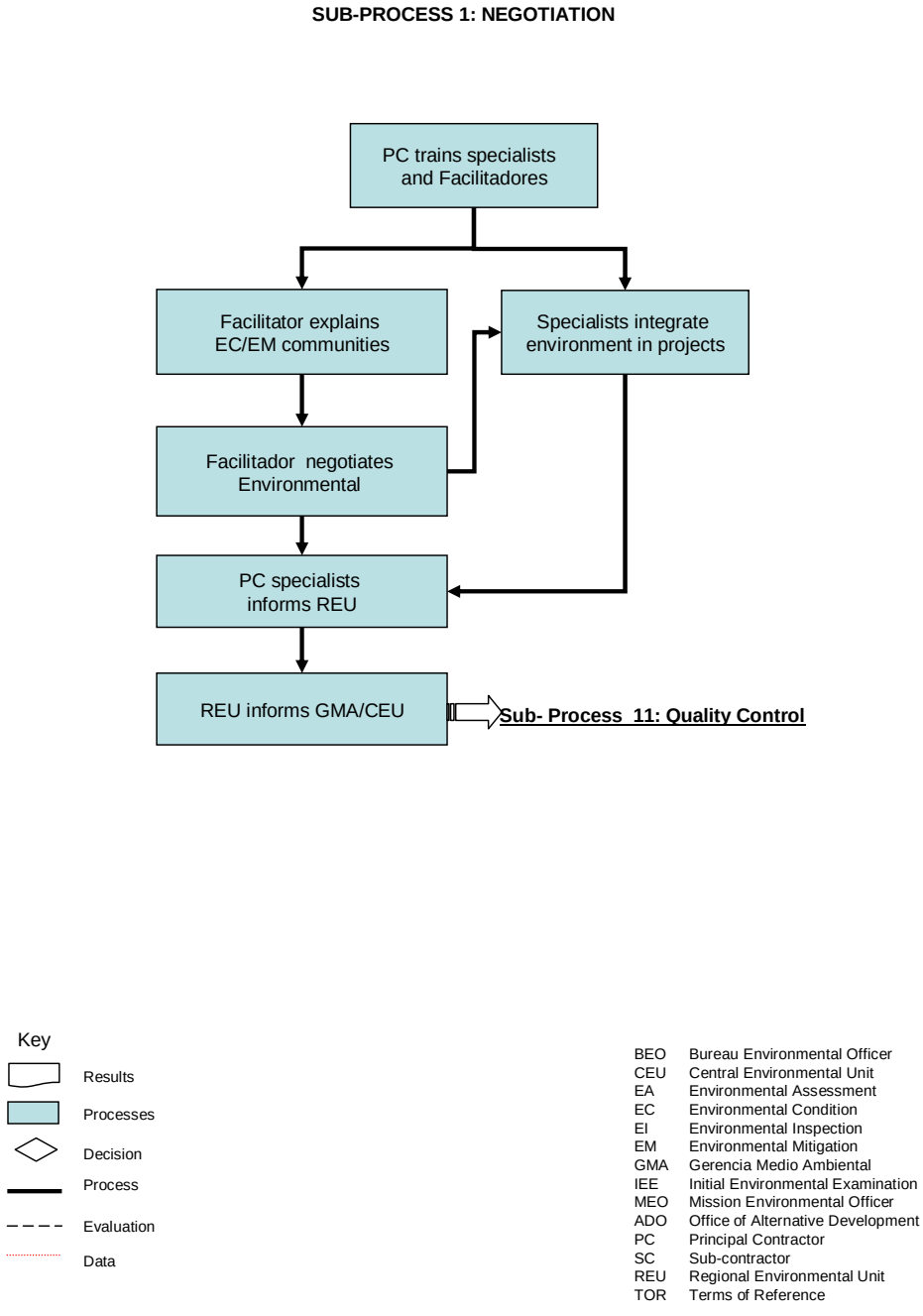
(3) Environmental commitments

Representatives of the rural community and/or local government(s) will sign the Global Agreement for Social Economic Development. This agreement will include a clause that states the commitments to environmental conservation made by the members of the rural community, the local governments, and the Expanded ADP. It will specifically refer to the implementation of Environmental Conditions and/or Environmental Mitigation Measures.

(4) Environmental integration in preliminary project conception

The technical specialists in the Principal Contractor's Regional Offices will make an inspection of the site(s) of the proposed project together with the REU. During these inspections the REU will formulate together with the technical specialists preliminary environmental considerations for inclusion in the project design and measures for the prevention or mitigation of potential negative environmental impacts. These potential negative environmental impacts and prevention or mitigation measures will be discussed with representatives of the rural community and/or local government.

Figure 5.3. Sub-process 1: Negotiation



Sub-Process 2: Reforestation

(1) Identification of reforestation sites

During the negotiation session(s) with the communities or the local governments and during subsequent consultations with the field staff of CADA, the REU will tentatively identify the location and area of the coca eradication sites. It will send this information to the regional office of the CEU and to the GMA Environmental Data Base.

(2) Determination of reforestation sites

The REU will determine the location and scope of the reforestation project, based on discussions with the coca growers who will eradicate coca and on field inspections. They will make a preliminary determination of the type of reforestation project(s) (plantation, agroforestry, protection) that will be undertaken.

(3) Contract for reforestation

The CEU will prepare the Terms of Reference for a reforestation contract to be awarded to a consulting firm or other institution. Through a competitive process the CEU will select the institution that demonstrates the best combination of technical capability, local experience, and cost to carry out the reforestation project together with the former coca farmers.

(4) Reforestation

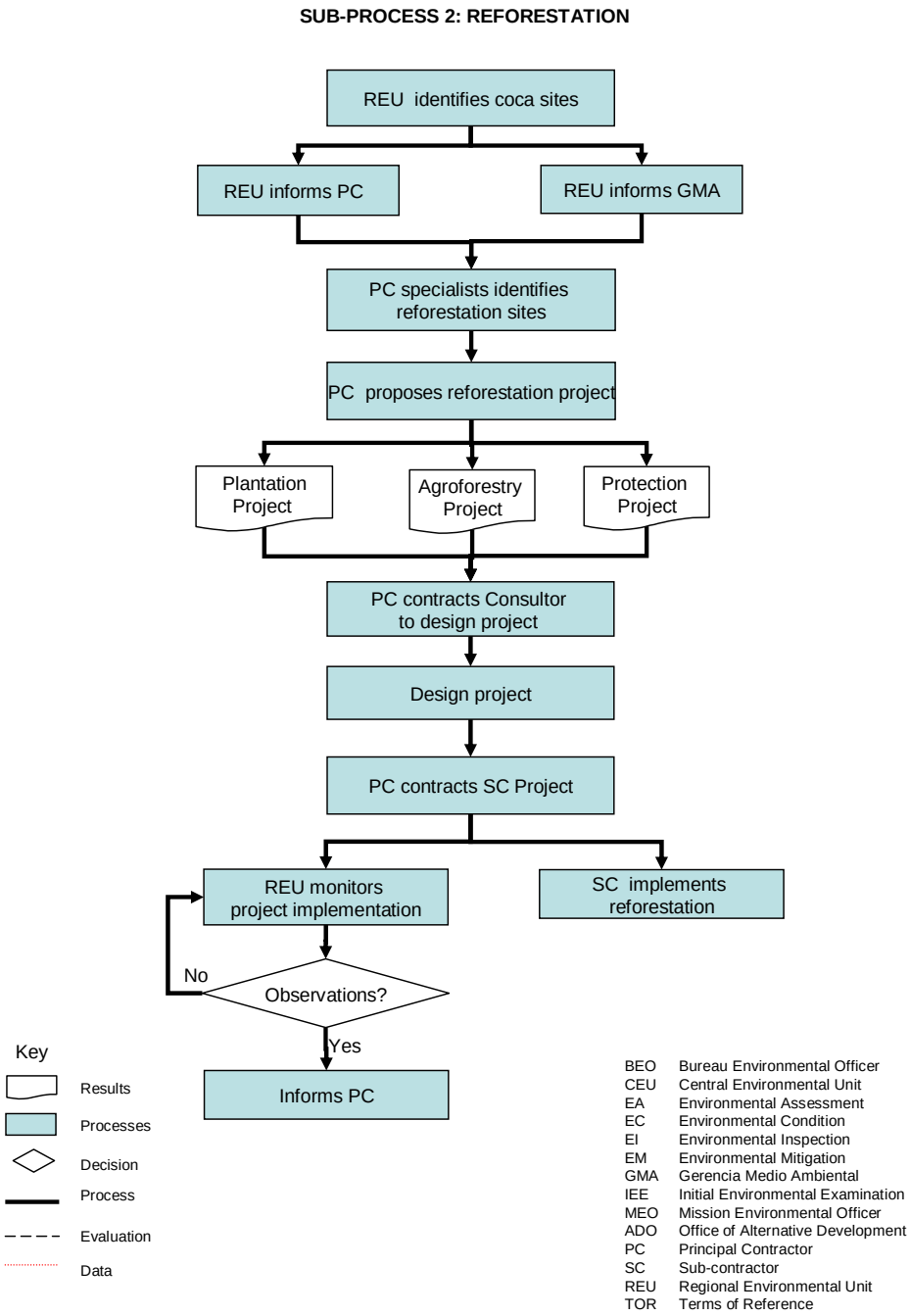
The reforestation will be undertaken. The REU will periodically check reforestation procedures against pre-established technical standards and procedures.

(5) Maintenance

The reforestation contract and the Global Agreement will include provisions for tree maintenance for at least two years after planting.

(6) The Principal Contractor will be responsible for disbursing funds for payment per number of trees or area of plantation successfully established, as measured by survival rates after two years.

Figure 5.4. Sub-process 2: Reforestation



Sub-Process 3: Technical Proposal

(1) Project selection

The community or local government selects the projects which it wishes the Expanded ADP to finance in exchange for voluntary coca eradication.

(2) Categorical Exclusion Projects

The professional staff of the REU decides whether the project falls under a Categorical Exclusion. If it does, then the project is registered in the Environmental Data Base as a Categorical Exclusion project.

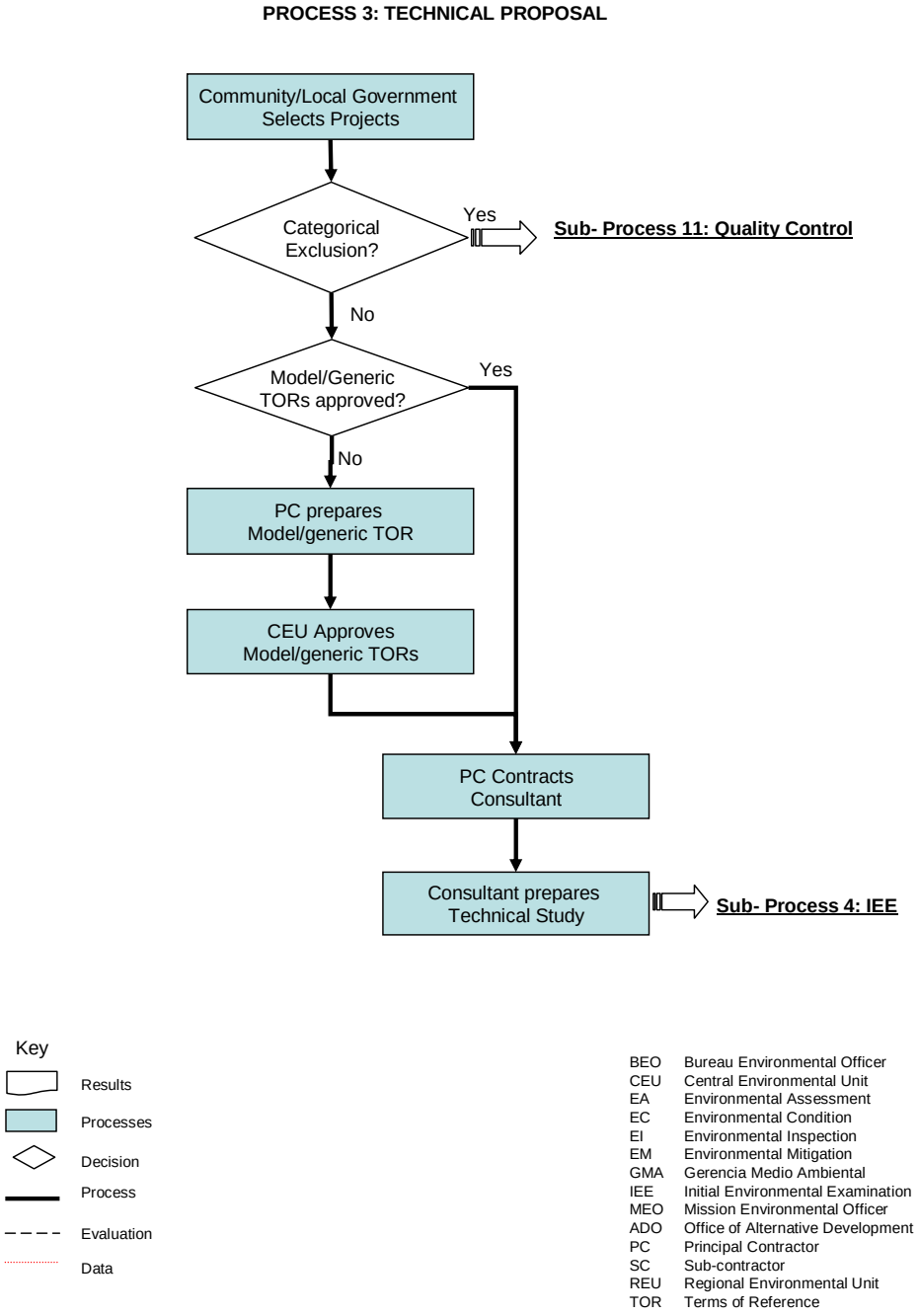
(3) Projects with Model (Generic) Terms of Reference

If the REU classifies the project as a project that does not fall under the Categorical Exclusion classification, then it so informs the CEU. The CEU determines whether the category of project already has approved model (Generic) Terms of Reference that include environmental considerations. If this category of project does have model Terms of Reference, then the Principal Contractor contracts a consultant to prepare the Technical Proposal, based on the model Terms of Reference.

(4) Projects without Model Terms of Reference

If the CEU determines that the category of project does not already have model Terms of Reference that include environmental considerations, then the Principal Contractor prepares model Terms of Reference for that category of project. It submits these model Terms of Reference to the USAID Office of Alternative Development (ADO) for approval. The ADO submits the model Terms of Reference to the Mission Environmental Officer for approval. When the model Terms of Reference have been approved, then the Principal Contractor prepares or subcontracts the preparation of the technical design for the project.

Figure 5.5. Sub-process 3: Technical Proposal



Sub-Process 4: Initial Environmental Examination

(1) Project Classification

Upon receipt of the Project Profile, the REU will review its description of the proposed activity and classify the project into one of three categories: Categorical Exclusion, Negative Determination, or Positive Determination. Table 5.1 indicates a probable classification of some of the types of projects which the Expanded ADP will finance. The Expanded ADP may, however, finance other types of projects.

Table 5.1. Environmental classification of potential projects to be financed by the Expanded ADP

Categorical Exclusion	Negative Determination		Positive Determination
	Without conditions	With conditions	
• Telecommunications • Credit • Strengthening local governments • Administration of justice • Market access	• Basic and social infrastructure	• Road rehabilitation • Electrification • Water systems • Reforestation • Forest concessions • Agriculture economic activities	• Road rehabilitation (large-scale and road construction) • Electrification (large-scale)

(2) Categorical Exclusion Projects

The REU will send an IEE to the GMA with justification and recommendation for a Categorical Exclusion. The GMA will review the IEE justification for a Categorical Exclusion and accept or reject the recommendation by his/her signature on the IEE document. If the GMA accepts the Categorical Exclusion recommendation, the project and the decision will be sent to the GMA Environmental Data Base. If the GMA rejects the IEE recommendation, then the IEE will be returned to the REU for clarification or adjustment.

(3) Positive Determination Projects

If the REU classifies a project in the Positive Determination category, then it will send a completed IEE to the GMA with a recommendation to that effect. The IEE will provide a justification for this recommendation based on the magnitude and type of the project. The IEE will also provide a preliminary set of environmental issues which the IEE believes that the Environmental Assessment should be considered.

(4) Negative Determination without Conditions

If the REU classifies a project in the Negative Determination without Conditions category, then it will send a complete IEE to the GMA with a recommendation to that effect. The GMA will review the recommendation and will accept or reject it. If the GMA accepts the recommendation, the IEE will be sent to the GMA Environmental Data Base. If the GMA rejects the recommendation, then the IEE will be returned to the REU for revision.

(5) Negative Determination with Conditions

If the REU classifies a project in the Negative Determination with Conditions category, then it will send a completed IEE to the GMA with a recommendation to that effect. The IEE will contain a justification for the recommendation. It will also contain the specific Environmental Conditions which the REU recommends for the project. These Environmental Conditions will often be based on standard design standards or implementation procedures. Most of the small-scale infrastructure projects, such as improvements or rehabilitation of short sections of roads, health posts, or schools, are likely to receive a Negative Determination with Conditions classification. The Environmental Conditions specified in the IEE, however, will generally be standard technical solutions that will avoid or mitigate the potential direct or indirect negative environmental impact. Environmental Conditions may also, however, be specific to the project under review, when the REU determines that the potential negative direct or indirect environmental impact can be avoided or mitigated through a procedure or means that can be specified in the IEE without further study and the GMA approves the classification of the project into the Negative Determination with Conditions category. It is expected that most projects involving road construction, rehabilitation or improvement in forested areas will be in this category.

Projects assigned a Negative Determination with Conditions category that involve the use of pesticides, and projects involving natural forest management must use the special processes.

- Road Projects in Forested Areas

When the Project Profile is for a road improvement, rehabilitation, or construction project, including the construction of bridges, the REU will consult the Principal Contractor's Geographic Information System Unit to determine if the project will occur within or outside of the area that has been defined as a forest area. If the project lies within a forested area then the REU will follow the specific procedures for road projects within forested areas.

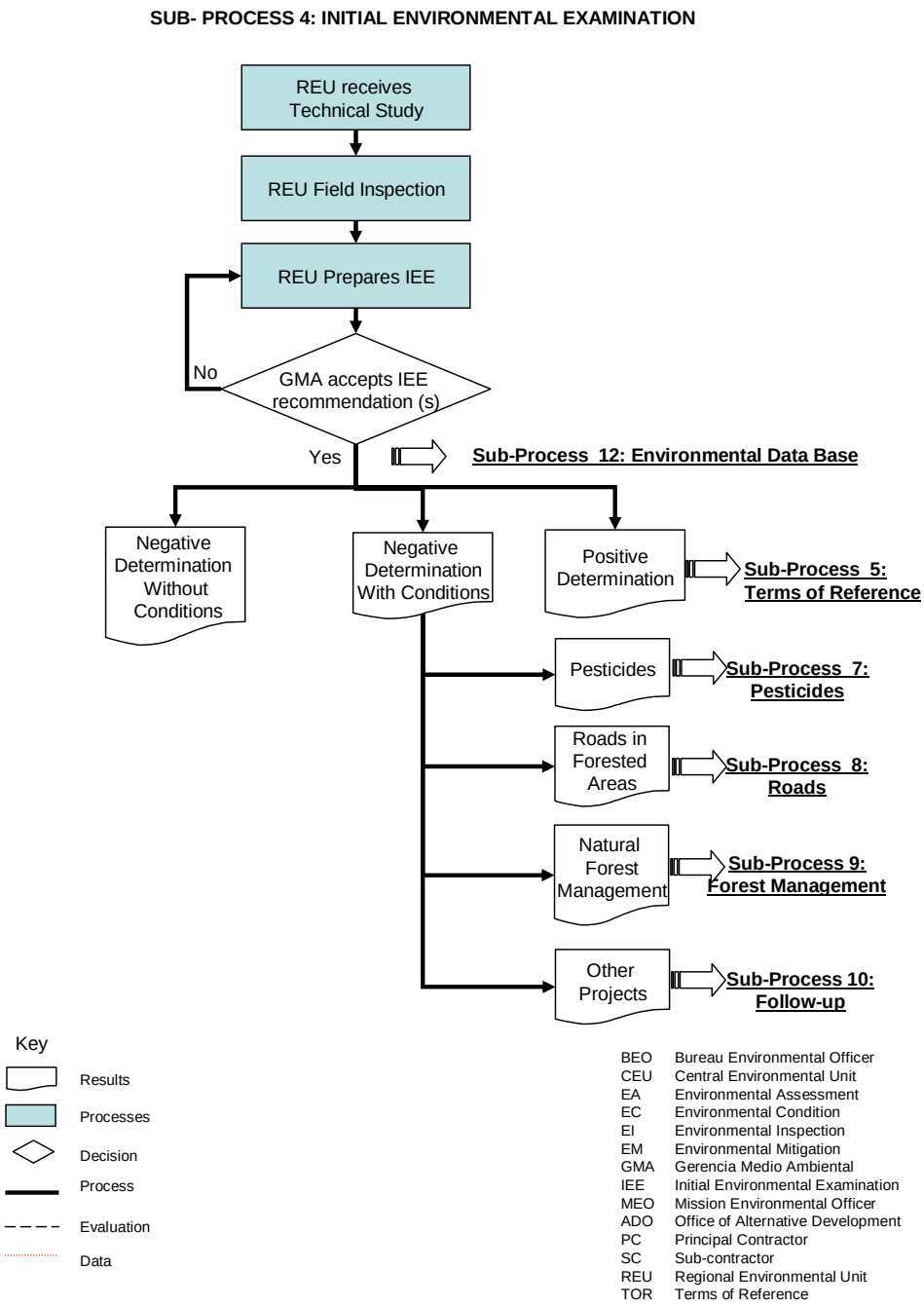
- Projects Involving the Use of Pesticides

If the REU determines, based on the Project Profile and other sources of information, that the project may include the use of Alternative Development Program funds for the purchase of pesticides or for some type of technical assistance or credit program that could result in the use of pesticides, then it will make the recommendation to the CEU in the IEE that the project be classified as a pesticide project. The CEU will then direct that the project follow the procedures established in the pesticide Environmental Assessment.

- Projects Involving Natural Forest Management

Natural forest management projects will be designed to adhere to Forest Stewardship Council standards and will be monitored through a process involving a forest management certifying entity.

Figure 5.6. Sub-process 4: Initial Environmental Examination



Sub-Process 5: Terms of Reference for an Environmental Assessment

(1) Preparation of Draft Terms of Reference

On the basis of the IEE, the Project Profile and field inspections if required, the Principal Contractor will prepare draft Terms of Reference (TOR) for the Environmental Assessment.

(2) Review of Terms of Reference

At the same time, the Principal Contractor will send the draft TOR to the GMA, the USAID/Peru Alternative Development Office, and the indicated Sector Ministry. The Principal Contractor will transmit the draft TOR formally with a letter and will require a countersignature in which the receipt of the draft TOR is acknowledged. The Principal Contractor will establish a date by which comments on the draft TOR must be received in order for them to be incorporated into the TOR. The letter will advise that non-receipt of comments will be considered as equivalent to approval of the draft TOR.

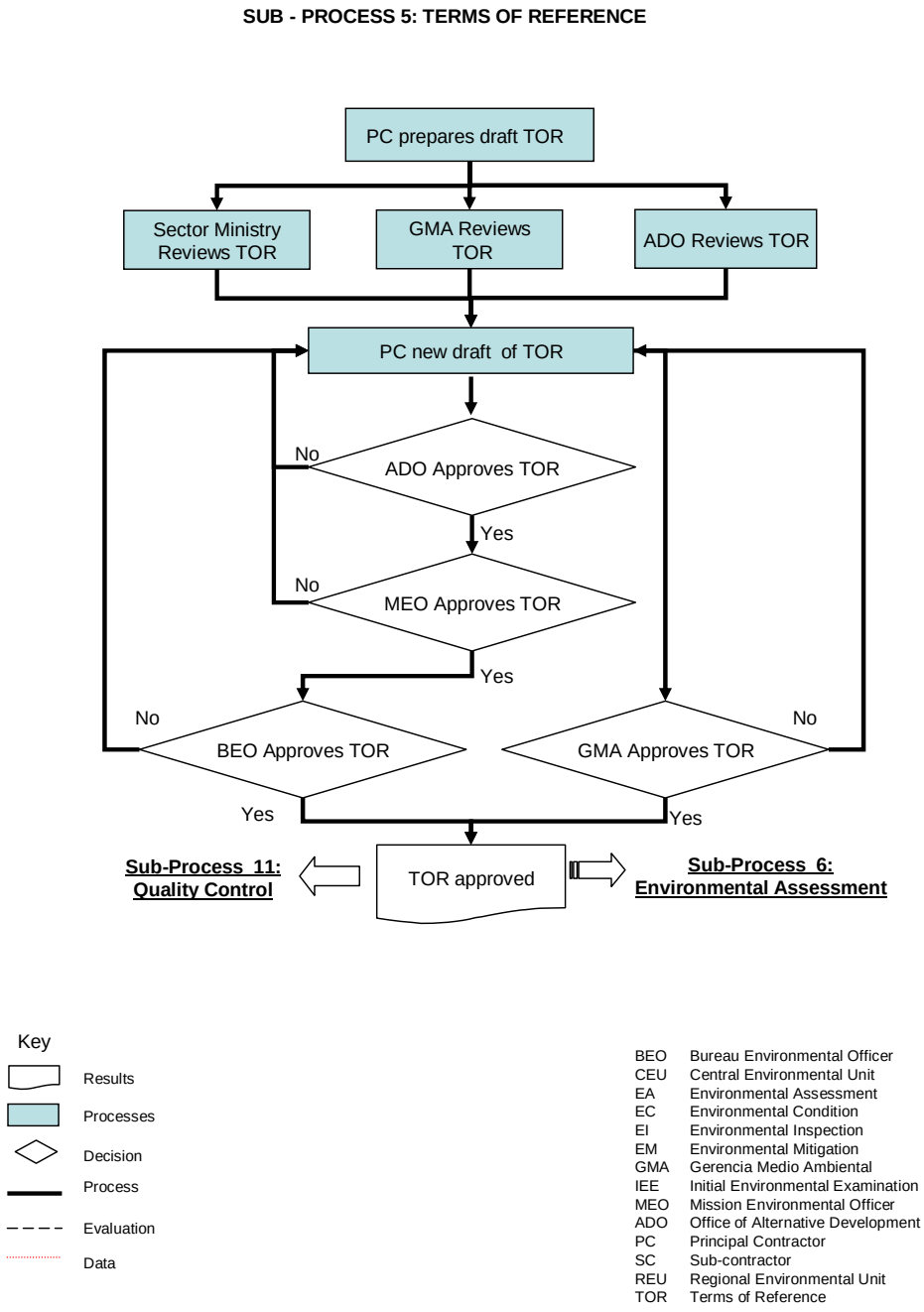
(3) Reconciliation of the Comments on the Draft Terms of Reference

Upon receipt of comments on the draft TOR from the USAID/Peru Alternative Development Office, the GMA, and the Sector Ministry, the Principal Contractor will revise the draft TOR to take these comments into account according to its own professional judgment and knowledge of the characteristics of the proposed project. If required, the Principal Contractor will organize a meeting between the GMA, the Sector Ministry and USAID/Peru Alternative Development Office to reconcile different professional judgments regarding the content of the TOR.

(4) Approval of Terms of Reference by USAID and GMA

The Principal Contractor will transmit the revised draft TORs to the USAID/Peru Alternative Development Office and to the GMA, with the request that they be approved. The Alternative Development Office will transmit the draft TORs to the Mission Environment Officer requesting review and transmittal to the Bureau Environment Officer for approval. If the Mission Environment Office requests clarifications or changes, he/she will return the draft TORs to the Alternative Development Office. Otherwise, he/she will transmit the draft TORs to the BEO, recommending their approval. The Bureau Environment Officer will review the draft Terms of Reference. If the BEO requires clarification or changes in the draft Terms of Reference he/she will so communicate to the MEO. Otherwise, the BEO will transmit approval of the TORs to the MEO. The MEO will transmit this approval to the ADO which will then transmit the approval to the Principal Contractor.

Figure 5.7. Sub-process 5: Terms of reference for an Environmental Assessment



Sub-Process 6: Preparation and Approval of an Environmental Assessment

(1) Preparation of Draft Environmental Assessment (EA)

The Principal Contractor will assign a qualified professional or team of professionals (EA Team) to the preparation of the EA, utilizing its own staff or contracted staff as required. The EA Team will prepare the EA according to the methodology and objectives established in the TOR.

(2) Review of Draft Environmental Assessment

The Principal Contractor will transmit the draft EA to OAD, GMA and the Sector Ministry. In transmittal letters to the GMA and the Sector Ministry, the Principal Contractor will request comments on the draft EA by an appropriate date.

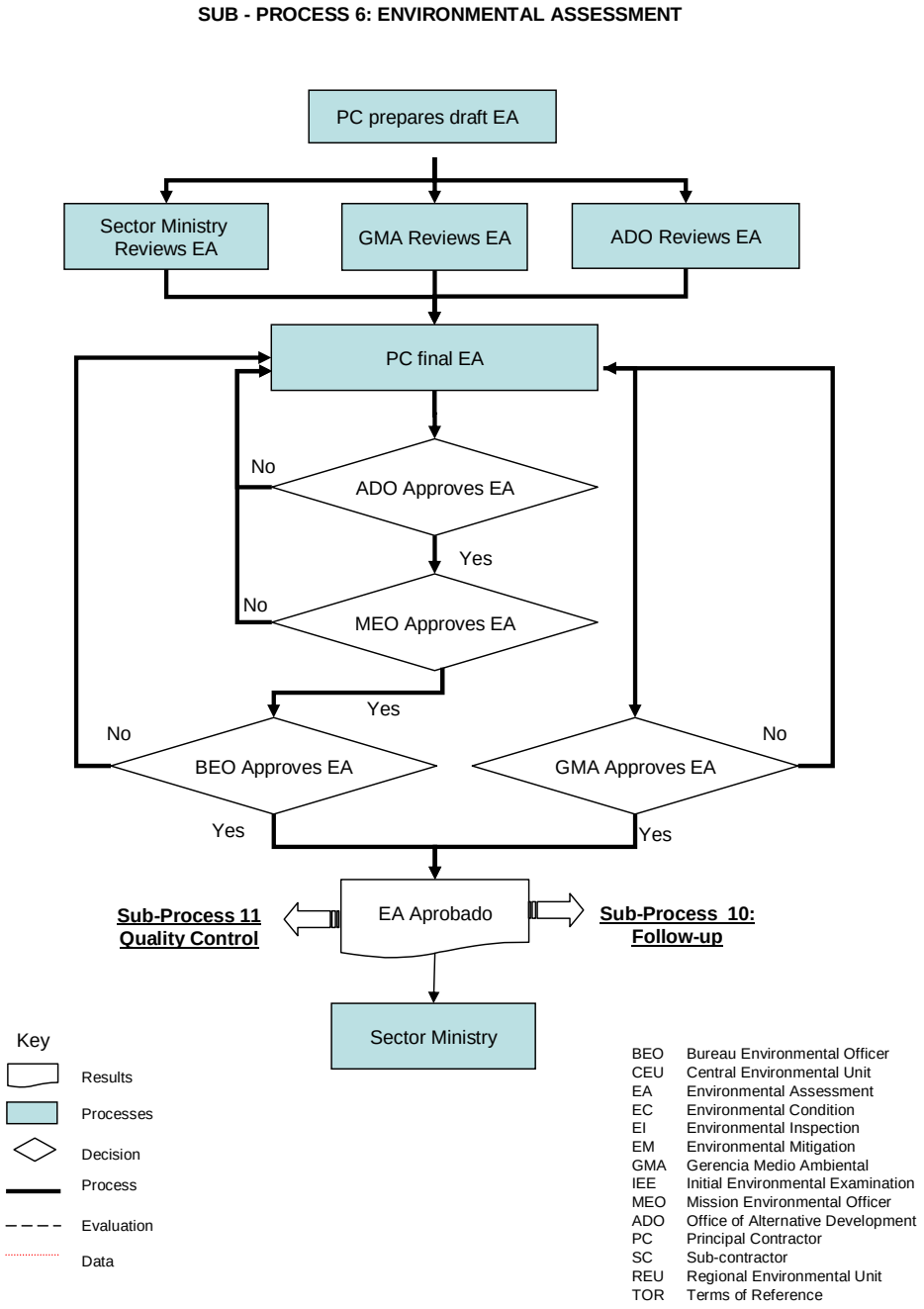
(3) Revision of the Draft Environmental Assessment

Upon receipt of comments, the Principal Contractor will instruct the EA Team to make revisions to the draft EA as it considers necessary according to its professional judgment.

(4) Approval of Environmental Assessment by USAID and GMA

The Principal Contractor will transmit the revised draft EA to the USAID/Peru Alternative Development Office and to the GMA, with the request that it be approved. The Alternative Development Office will transmit the draft EA to the Mission Environment Officer requesting review and transmittal to the Bureau Environment Officer for approval. If the Mission Environment Office requests clarifications or changes, he/she will return the draft EA to the Alternative Development Office. Otherwise, he/she will transmit the draft EA to the BEO, recommending their approval. The Bureau Environment Officer will review the draft Terms of Reference. If the BEO requires clarification or changes in the draft EA he/she will so communicate to the MEO. Otherwise, the BEO will transmit approval of the EA to the MEO. The MEO will transmit this approval to the ADO which will then transmit the approval to the Principal Contractor. Once the EA is approved the GMA Director sent it to the Sector Ministry.

Figure 5.8. Sub-process 6: Preparation and Approval of an Environmental Assessment

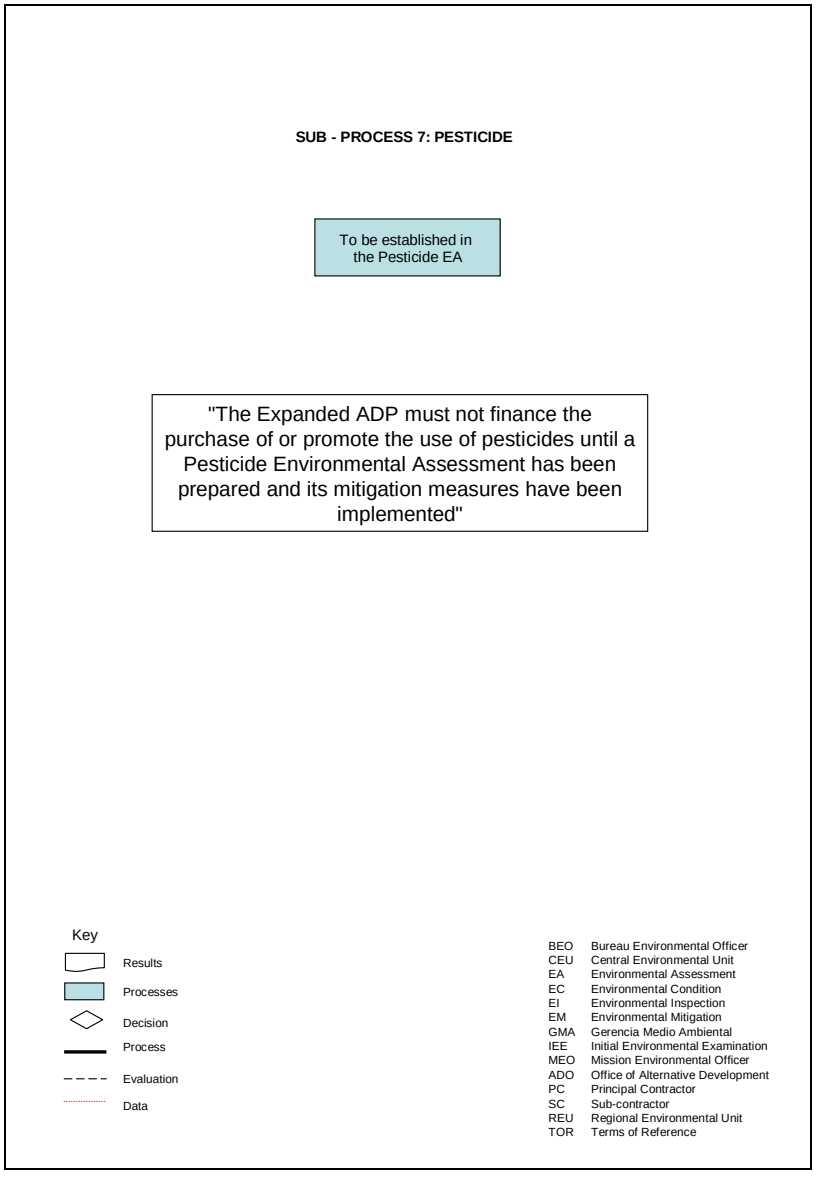


Sub-Process 7: Pesticide Use

(1) Pesticide Use Environmental Assessment

If the IEE finds that the project will involve financing the use or promotion of use of pesticides with Expanded ADP funds, then the CEU will direct the project to the Sub-Processes that have been defined in an approved Pesticide Environmental Assessment. The Expanded ADP should not finance or promote the use of pesticides before the preparation of a separate pesticide Environmental Assessment and the implementation of its mitigation measures.

Figure 5.9. Sub-process 7: Pesticide Use



Sub-Process 8: Natural Forest Management

(1) List of Natural Forest Management Projects Financed by Alternative Development Program

The Principal Contractor will prepare a list of all the natural forest management projects which receive financing from the Expanded ADP. The list will include the name, location, size, owner and other relevant data concerning the forest management unit. It will also summarize the forest management's unit stage of forest management (preparation of management plan; implementation of management plan; sale of forest products; certification, etc.)

(2) Preparation of Terms of Reference

The Principal Contractor will prepare Terms of Reference (TOR) for an independent forest management certification entity to carry out a scoping of a sample of the forest management units that have received financing from the Expanded ADP. The TORs will make clear that the purpose of the scoping study will be to measure compliance with USAID Environmental Regulations and FAA 118 and 119 as well as to provide the forest owner and USAID with an evaluation of the degree to which the forest management unit complies with the standards of the Forest Stewardship Council's forest management Principles and Criteria. The Terms of Reference will require the certification entity to use its standard format for the preparation of its reports on the forest management units, including the categories of Pre-Conditions, Conditions, and Recommendations.

(3) Selection of Certification Entity

The Principal Contractor will select a certification entity through a competitive process. It will then contract the certification entity for the duration of its contract with USAID for the implementation of the Expanded ADP.

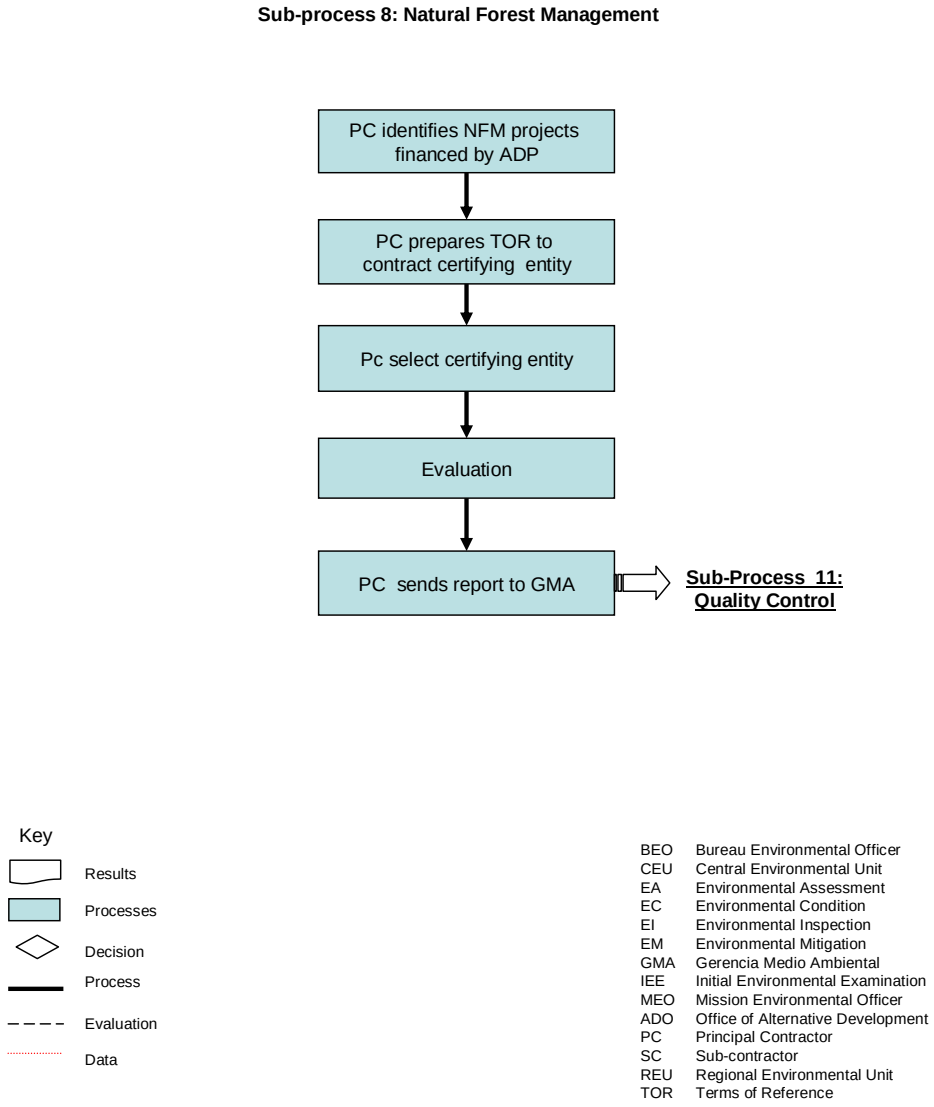
(4) Implementation of the Scoping Evaluation

The selected certification entity will make Scoping Evaluation. The selection of forest management units to evaluate in the Scoping Evaluation will be done on a random basis by the certification entity. Subsequently, however, USAID may request the certification entity to include specific forest units and specific issues.

(5) Reporting

The reports of the certifying entity will not be confidential to the owners of the forest units. They will be distributed by the Principal Contractor to USAID, the GMA and international environmental organizations involved in the Expanded ADP.

Figure 5.10. Sub-process 8: Natural Forest Management



Sub-Process 9: Roads in Forested Areas

(1) IEE Recommendation for a Road Project

The IEE makes a recommendation to the GMA for assigning a road project a Negative Determination with Conditions or a Positive Determination. No road project will receive a Negative Determination without Conditions or a Categorical Exclusion. The GMA either accepts or rejects the recommendation of the REU. If the GMA rejects the recommendation then the IEE is returned to the REU for revision.

(2) Classification of Road Projects

If the road project receives a Positive Determination, then the Terms of Reference for an Environmental Assessment are prepared following the procedures for a Positive Determination. If the road project receives a Negative Determination with Conditions, then the road project is classified as occurring in an area where it will potentially affect significant areas of natural forest or as occurring in an area where it will not affect significant areas of natural forest. This determination will be made based on the base map of forest areas that was prepared for the PEA and subsequently improved by the PC.

(3) Road Projects in Areas without Significant Natural Forest

A standard IEE will be prepared for a road project that will not affect significant areas of natural forest. These standard recommendations usually will mostly concern the direct negative impacts of the road rather than the indirect negative impacts.

(4) Road Project in Areas with Significant Natural Forest

Road projects in areas with significant natural forest will be handled according to a specific sequence. The natural forest areas will be divided into private forest and public forest using satellite images and ground checks. The forest will generally be mapped and separated into private and public forest to about 5 km to each side of the planned route of the road.

(5) Private Forest Areas

Private forest areas will be protected through a program of technical assistance and training for the private forest owners. The PC will provide technical assistance and training through contracts with consultants, consulting companies or NGOs. The purpose of the program will be to give the private forest owners the incentive and means to manage some or all of the forest on their land for the production of market and non-market goods and services. The private forest management program will respond to the forest owners requirements and may include reforestation and agroforestry actions as well as management of natural forest areas.

(6) Public Forest Areas

Public forest areas to each side of the planned road will be delimitated for the purpose of declaring them municipal forests, either in the category of "Local Forests," as defined under the Forestry Law, or as "Protected Forests," as defined under the Protected Areas Law. Given the wider scope that "Public Forests" offer for production and protection, rather than just protection, generally the forests will be declared "Local Forests," if it contains a fairly high proportion of potentially permanent production forest. The Expanded ADP will assist the municipal government to request the status of "Local Forest" or "Protected Forest" from INRENA.

(7) Preparation of Forest Management Plans

The PC will contract out the preparation of management plans for the "Public Forests" or "Protection Forests."

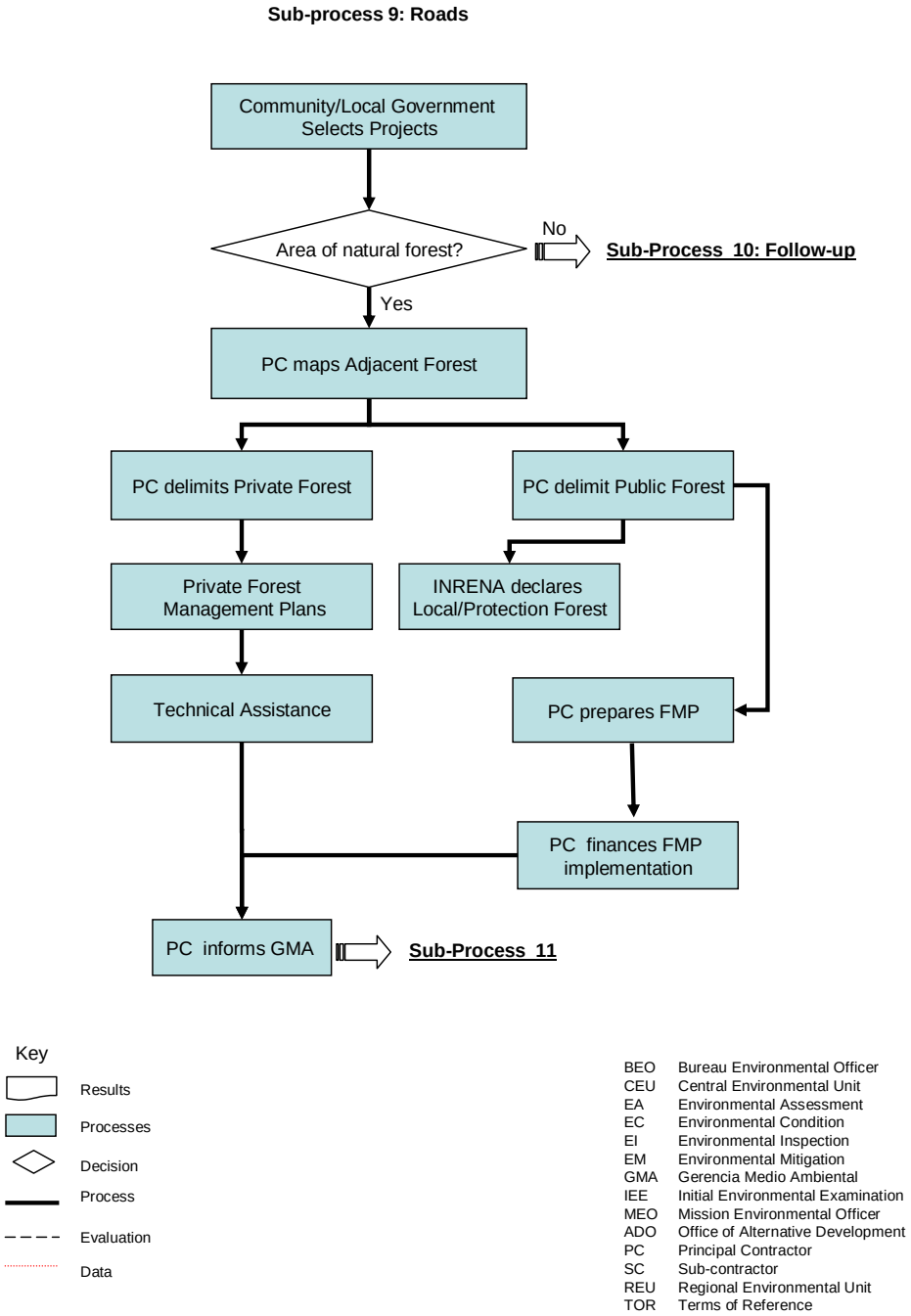
(8) Implementation of Forest Management Plans for "Local Forests"

The PC will finance some of the initial steps of the implementation of the forest management plans for "Local Forests," with the purpose of generating income from the sale of forest products that can then be used to pay for forest management.

(9) Information to the GMA

The PC will provide information to the GMA on the number of road projects that occur in forested areas, the recommendation of the IEE, the actions that have been taken to prepare private and public forest management plans, and the number of requests for the declaration of "Local Forests" or "Protection Forests" that have been sent to INRENA. The GMA will regularly request an update from INRENA on the actions that INRENA has taken on these requests and advise the PC accordingly.

Figure 5.11. Sub-process 9: Roads



Sub-Process 10: Follow-Up Monitoring

(1) Notification to Project Sub-contractor (SC) of Required Environmental Conditions (EC) or Environmental Mitigation Measures (EMM)

The REU will communicate in writing to the SC the project's Environmental Conditions or Mitigation Measures. It will obtain the countersignature of the Contractor or Grantee on this notification, certifying that they have read and understood these Environmental Conditions or Environmental Mitigation Measures.

(2) The REU will inform the Project SC that the REU staff will make up to three Environmental Inspections during the course of the project. These could include an Initial Inspection, an Implementation Inspection, and a Final Inspection. The REU and the SC will coordinate the Initial Inspection and the Final Inspection.

(3) Plan Environmental Inspections to follow up on Environmental Conditions and Mitigation Measures

The REU will plan a program of Environmental Inspections to follow-up on the Environmental Conditions and Environmental Mitigation Measures. It will program Initial, Implementation, and Final Environmental Inspections, as it deems necessary. The Initial and Final Environmental Inspections will be coordinated with the Project SC. The Implementation Environmental Inspection will be made without previous notification to the Project Implementer.

(4) Environmental Inspections

The REU will make Initial, Implementation and Final Environmental Inspections during the period of a project's planning, implementation, and completion respectively. The Initial Environmental Inspection will ensure that the Project Implementer thoroughly understands the Environmental Conditions or Environmental Mitigation Measures and has the intention and capability to implement them. The Implementation Environmental Inspection has two purposes. First, the REU staff will check on the Project SC's compliance with the Environmental Conditions or Mitigation Measures while the project is being implemented. Second, the REU staff will check on the existence and degree of significance of the project's negative environmental impacts, including those that may not have been foreseen in the IEE or the EA. The Final Environmental Inspection has the purpose of confirming full compliance by the Project SC of the Environmental Conditions or Environmental Mitigation Measures.

(5) Environmental Stop Work Orders

If during the Implementation Environmental Inspection, the REU staff identifies significant negative environmental impacts that cannot be immediately avoided or mitigated through adjustments in the implementation procedures, then they may issue a stop work order to the Project SC. The Environmental Stop Work Order will be supported by the appropriate language in the environmental clause of each contract or grant.

(6) Identification of Unforeseen Environmental Impacts.

During any one of the three types of Environmental Inspections it is possible that the REU staff may identify significant negative environmental impacts that were not foreseen in the IEE or the EA. In such cases, the REU staff will, if possible, immediately formulate avoidance or mitigation measures. If the avoidance or mitigation of negative impacts requires actions that cannot be implemented without a substantial change in operating practices or project budget, then the REU staff will communicate its observations immediately to the Principal Contractor. The Principal Contractor will then immediately consult with the Project Implementer and take measures to further evaluate the negative environmental impacts and formulate effective avoidance or mitigation measures. The Principal Contractor will record the actions that have been taken to correct, avoid, or mitigate the negative environmental impact.

(7) Reporting on Field Inspections

The REU staff will prepare field inspection reports as soon as practically possible. To do so, it will utilize a standard format and send the report by email to the CEU and to the GMA Environmental Data Base.

Figure 5.12. Sub-process 10: Follow-up monitoring (Initial Inspection)

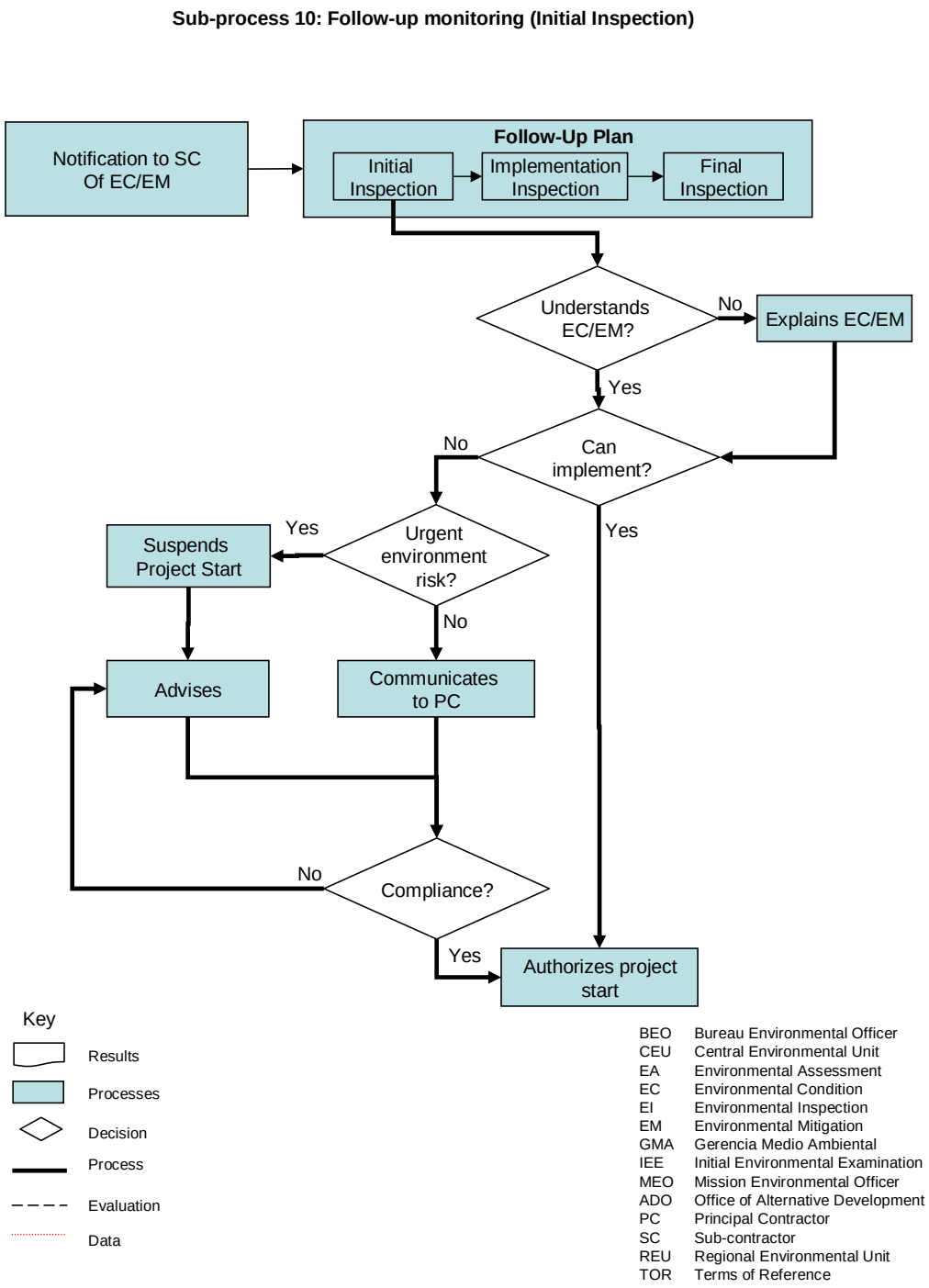


Figure 5.13. Sub-process 10: Follow-up (Implementation Environmental Inspection)

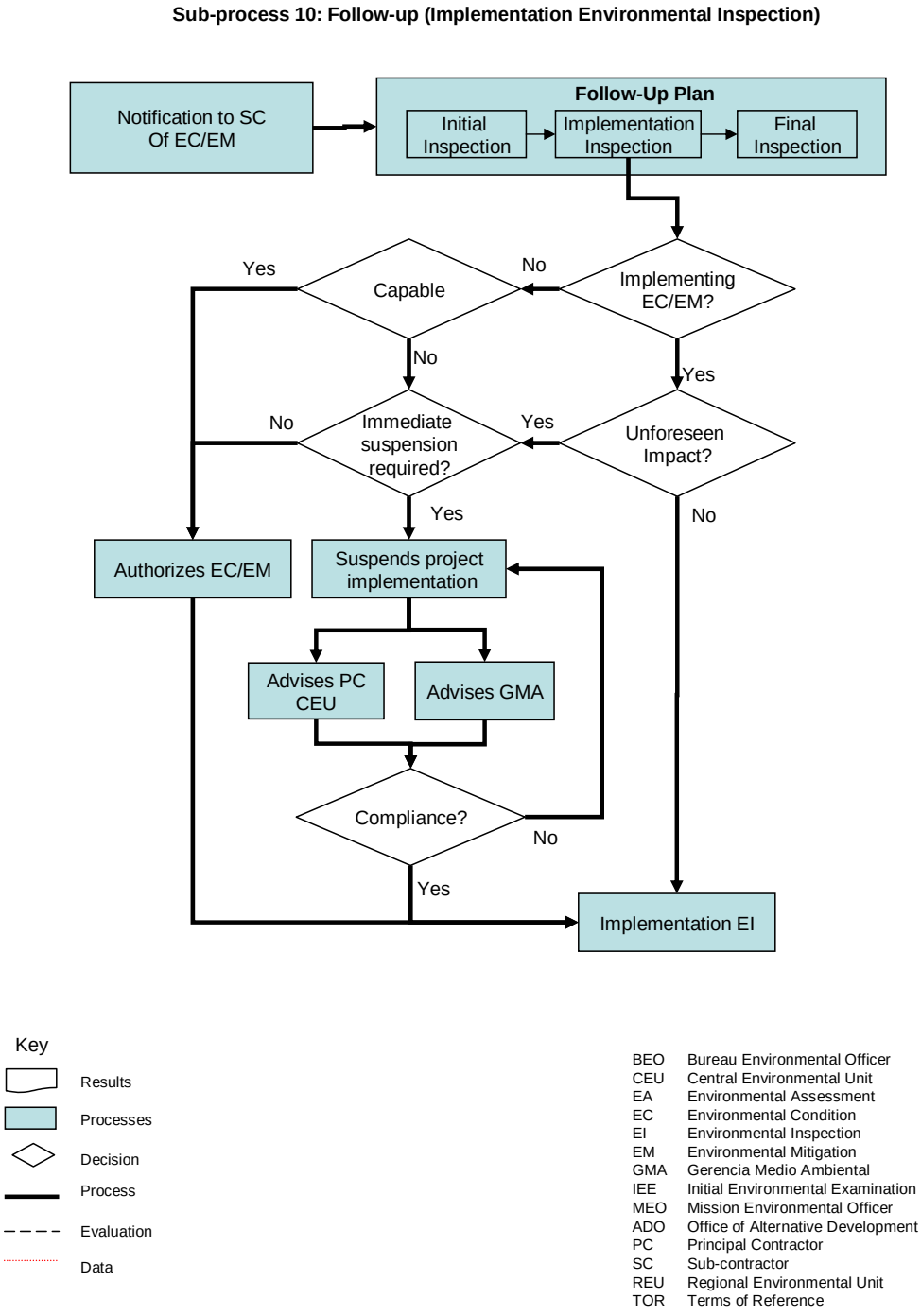
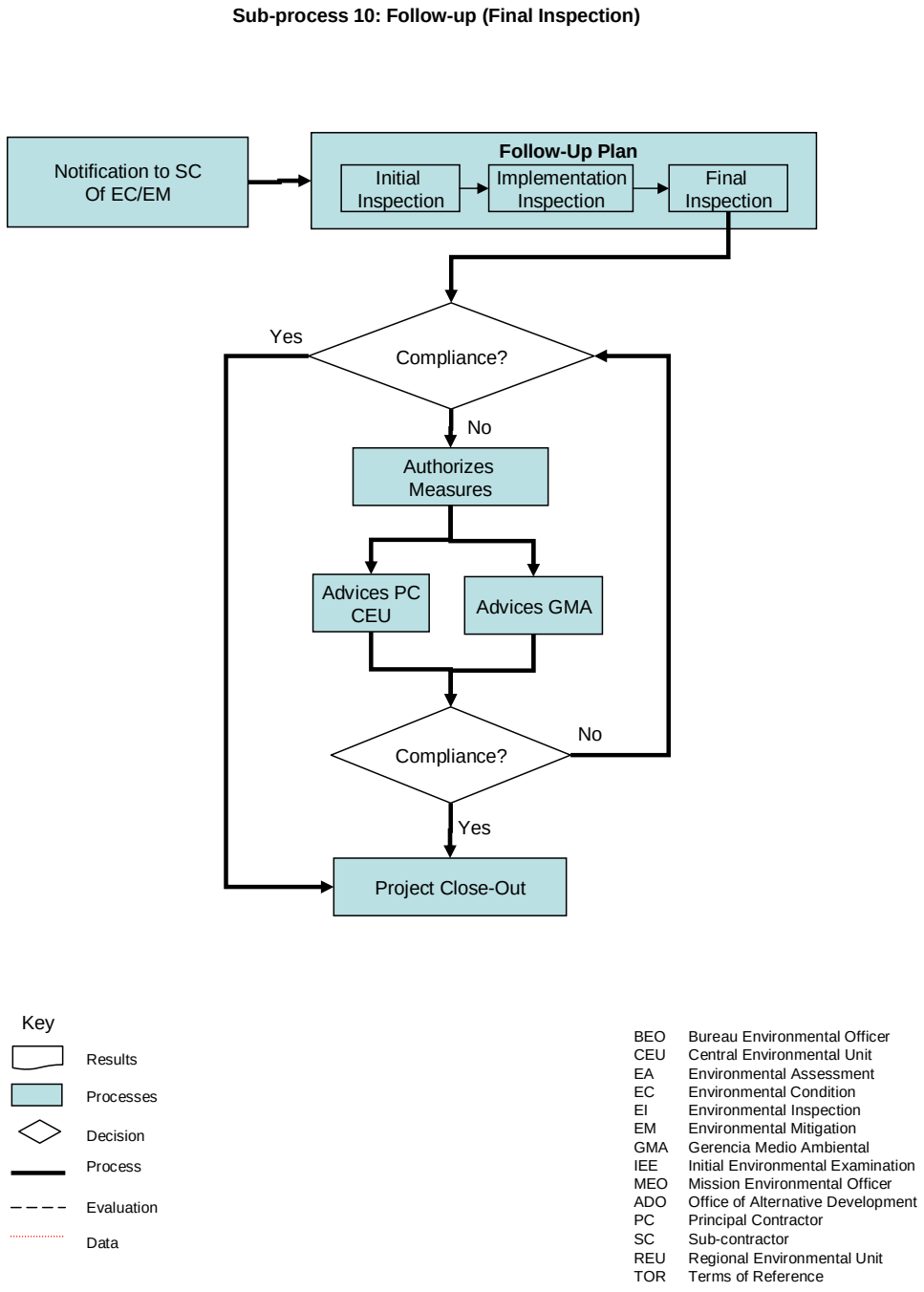


Figure 5.14. Sub-process 10: Follow-up (Final Inspection)



Sub-Process 11: Quality Control

(1) Quality Criteria

The Central Environmental Unit will establish criteria for measuring the effectiveness and efficiency of the environmental process. These criteria will include such variables as percentage of projects for which an IEE is prepared before project approval and financing occurs, the percentage of projects which specifically include environmental considerations in their Technical Proposal, and the percentage of projects which have Initial, Implementation or Final Environmental Inspections.

(2) List of Projects with Negative Determination with Conditions and Positive Determinations

The CEU will coordinate with the DEVIDA GMA the preparation and updating of a list of projects with Negative Determinations with Conditions or Positive Determinations with their respective Environmental Conditions or Environmental Mitigation Measures.

(3) Selection of Sample for Field Inspections

Using the list of project with Negative Determinations with Conditions and Positive Determinations, the CEU will select a sample of projects for field inspections. Field inspections will include the entire range of different types of projects but will emphasize projects that have received a Positive Determination or projects that have the potential to cause widespread, irreversible negative impacts such as road projects.

(4) Field Inspections

The professional staff of the CEU will make field inspections of Expanded ADP projects specifically to evaluate compliance with Environmental Conditions and Environmental Mitigation Measures. During the field inspections, however, the CEU staff will also evaluate the overall functioning of the Environmental Process and make adjustments as required in the procedures. During the field inspections the CEU staff will also evaluate the professional capabilities of the staff of the Regional Environmental Unit (REU), based on their preparation of IEEs and follow up on Environmental Conditions and Environmental Mitigation Measures.

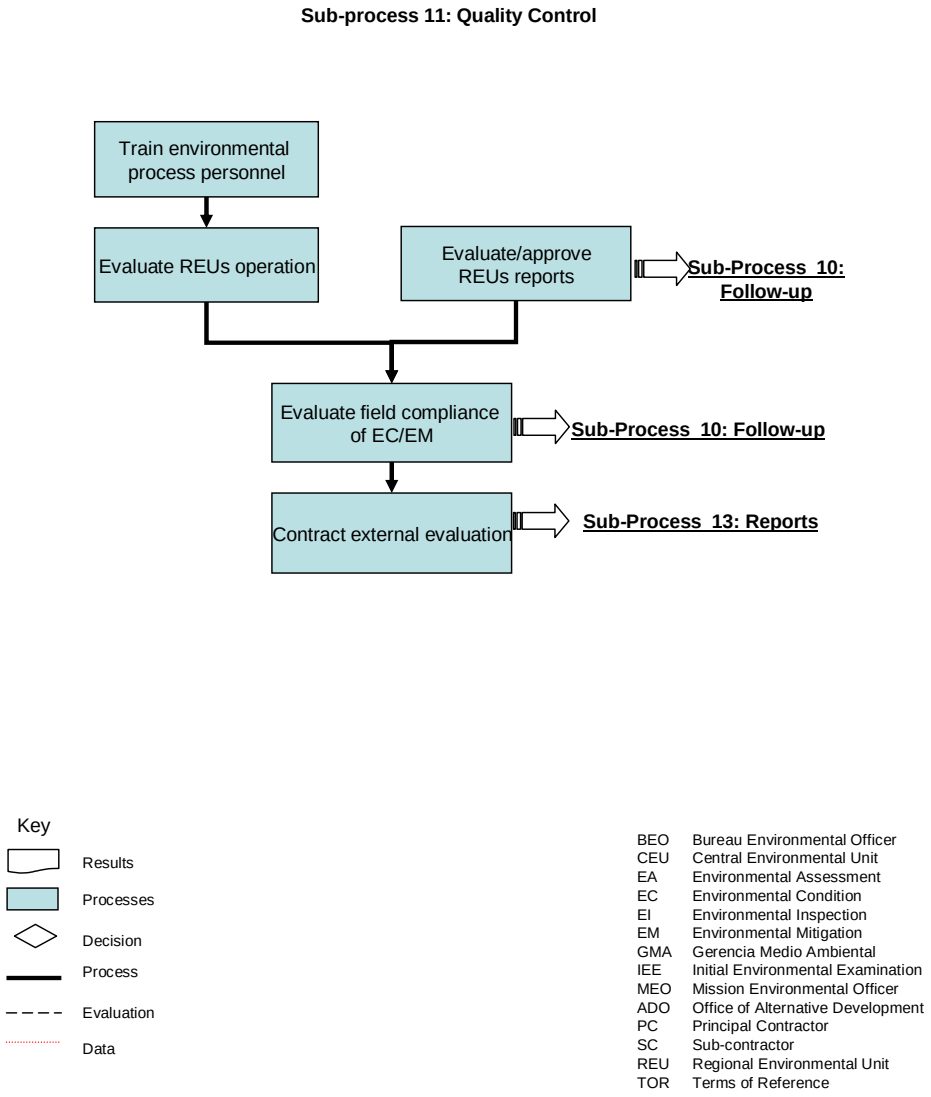
(5) Independent Evaluation

The CEU will contract a yearly independent evaluation of the Environmental Process. The evaluation will be based on field inspections, interviews, and analysis of the data in the Environmental Data Base. The evaluation will make recommendations for improving the Environmental Process, including making it more efficient and effective. It will specifically address the adequacy of the type and number of professional and technical staff working in the Environmental Process at the central and field levels.

(6) Workshop

The CEU will organize a yearly workshop that will include all of the environmental staff of the Principal Contractor, DEVIDA, Environmental Institutions, and USAID in order to analyze the conclusions and recommendations of the independent evaluation and formulate specific means to respond to them.

Figure 5.15. Sub-process 11: Quality Control



Sub-Process 12: Data collection and analysis

(1) Record creation

A record is created in the GMA Environmental Data Base upon the receipt of each IEE.

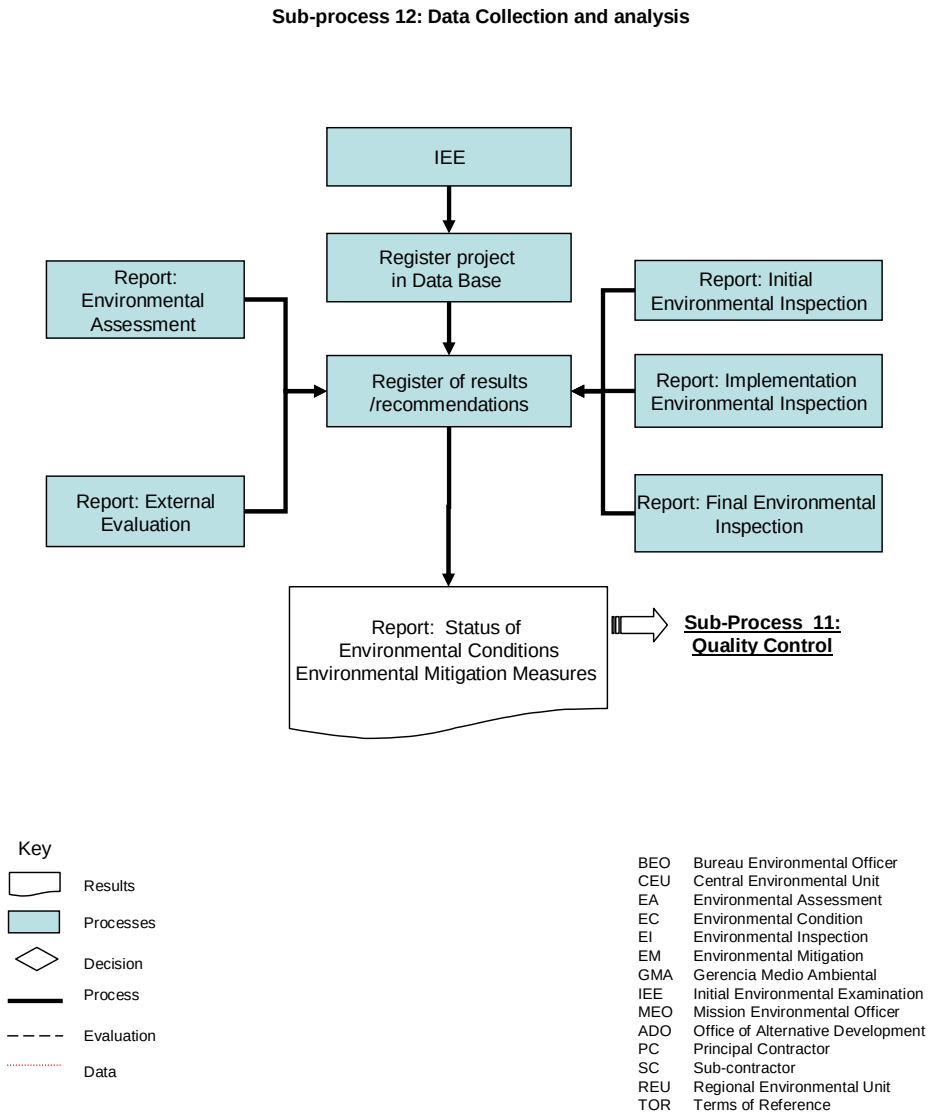
(2) Data Collection

Data will be entered in the GMA Environmental Data Base on the Environmental Conditions stated in the IEEs the Mitigation Measures required by the Environmental Assessments, and the principal observations and recommendations made in field inspections.

(3) Reports

The GMA Environmental Data base will be a principal source of data for the preparation of periodic reports on the operation of the Environmental Process. These reports will specifically focus on the status of Environmental Conditions and Environmental Mitigation Measures.

Figure 5.16. Sub-process 12: Data Collection and analysis



Sub-Process 13: Reporting

(1) Field Reporting

At specific points in the Environmental Process reports the Regional Environmental Units will be required to send reports to the Central Environmental Unit and to the GMA Environmental Data Base.

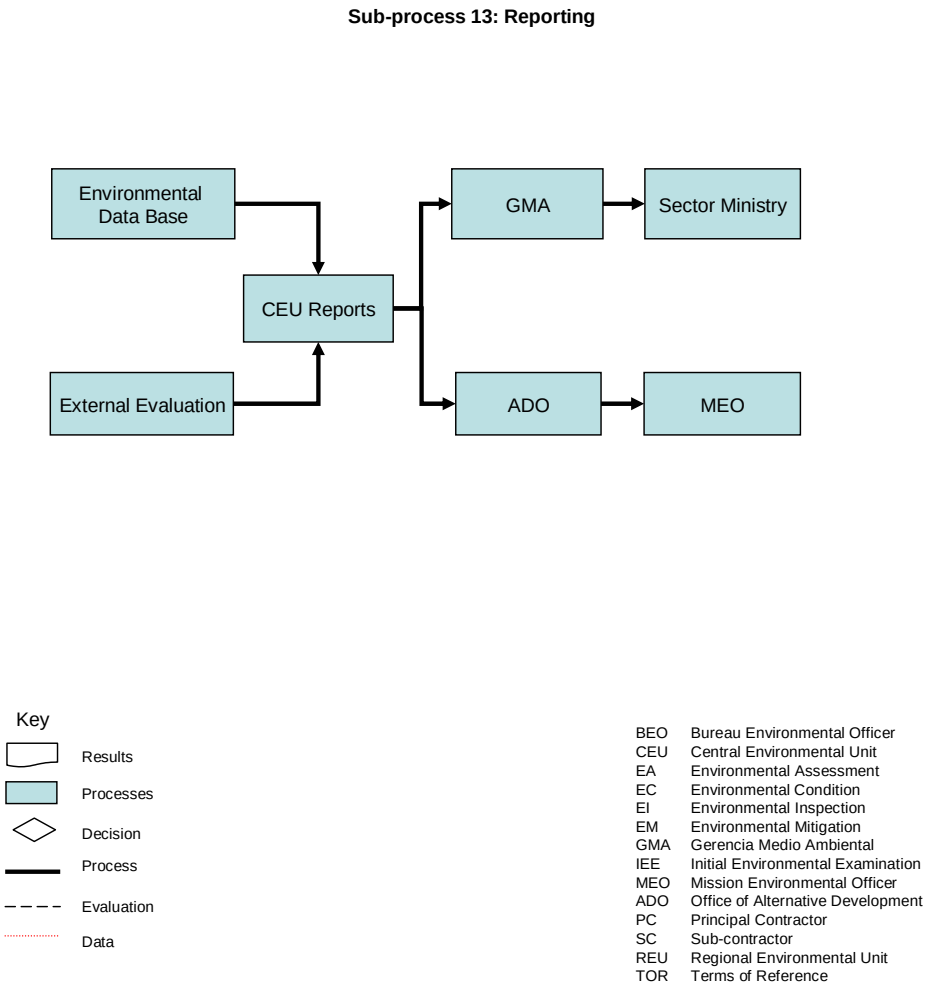
(2) Yearly Environmental Report

Based on the report of the independent evaluation and its own analysis of the data in the Environmental Data Base, the CEU will prepare a yearly report of the Expanded Alternative Development Program on its Environmental Process. The report will present the successes and weaknesses of the Environmental Process and suggest means to correct the weaknesses.

(3) Report Distribution

The CEU will distribute the report to USAID, DEVIDA, and the Sector Ministry. These institutions will then be responsible for internal distribution of the report.

Figure 5.17. Sub-process 13: Reporting



5.3 Contract Environmental Provisions

Categorical Exclusions

When the CEU has issued a Categorical Exclusion for all of the activities to be financed by the contract (grant) then the contract (grant) should have a clause that states the following:

> The Central Environment Unit of the Expanded Alternative Development Program has issued a Categorical Exclusion for all of the activities to be financed under this Contract (Grant). The Contractor (Grantee) is not required to implement any mitigation measures for negative environmental impacts. The Contractor (Grantee) is required, however, to be aware of negative environmental impacts that the activities financed under this Contract (Grant) may cause. If such negative impacts appear likely to occur, then it is the obligation of the Contractor (Grantee) immediately to take measures to avoid additional negative environmental impacts from actions financed with USAID funds and advise USAID (DEVIDA, Contractor) of the potential negative environmental impacts.

Negative Determination without Conditions

When the CEU has issued a Negative Determination without Conditions for all of the activities to be financed by the contract (grant) then the contract (grant) should have a clause that states the following:

> The Central Environment Unit of the Expanded Alternative Development Program has issued a Negative Determination without Conditions for all of the activities to be financed under this Contract (Grant). The Contractor (Grantee) is not required to implement any mitigation measures for negative environmental impacts. The Contractor (Grantee) is required, however, to be aware of negative environmental impacts that the activities financed under this Contract (Grant) may cause. If such negative impacts appear likely to occur, then it is the obligation of the Contractor (Grantee) immediately to take measures to avoid additional negative environmental impacts from actions financed with USAID funds and advise the Principal Contractor of the potential negative environmental impacts.

Negative Determination with Conditions

When the CEU has issued a Negative Determination with Conditions for all of the activities to be financed by the contract (grant) then the contract (grant) should have a clause that states the following:

> The Central Environment Unit of the Expanded Alternative Development Program has issued a Negative Determination with Conditions for all of the activities to be financed under this Contract (Grant). The Contractor (Grantee) has responsibility for being cognizant of these conditions. Before expending funds under this contract (grant) the Contractor (Grantee) must present to the Central Environmental Unit an Environmental Plan for compliance with these conditions. This Environmental Plan must be approved in

> writing by the Central Environmental Unit before the Contractor (Grantee) expends any USAID funds under this Contract (Grant). The Contractor (Grantee) will not receive reimbursement for any funds that it expends previous to such approval, even if such activities are shown to have no negative environmental impacts and form part of the Contract (Grant).

Positive Determination

When USAID (DEVIDA) has issued a Positive Determination for all of the activities to be financed by the contract (grant) then the contract (grant) should have a clause that states the following:

> The Central Environment Unit of the Expanded Alternative Development Program has issued a Positive Determination for all of the activities to be financed under this Contract (Grant). An Environmental Assessment has been prepared for these activities. The Contractor (Grantee) has responsibility for being cognizant of the content of this Environmental Assessment. Before expending funds under this contract (grant) the Contractor (Grantee) must present to Central Environment Unit of the Expanded Alternative Development Program (DEVIDA) an Environmental Plan for compliance with the mitigation and monitoring measures contained in the Environmental Assessment that have been approved by the LAC Bureau Environmental Officer (BEO). This Environmental Plan must be approved in writing by the Central Environment Unit of the Expanded Alternative Development Program before the Contractor (Grantee) expends any USAID funds under this Contract (Grant). The Contractor (Grantee) will not receive reimbursement for any funds that it expends previous to such approval, even if such activities are shown to have no negative environmental impacts and form part of the Contract (Grant).

An activity may be issued some combination of Categorical Exclusion, Negative Determination, and Positive Determination. In such cases, the environmental clause in the contract or grant must be modified to reflect this combination.

5.4 Training for the Functioning of the Expanded ADP Environmental Process

The capabilities of the professional environmental staff who will work in the operation of the Expanded ADP Environmental Process will to a large degree determine its effectiveness. Their degree of professional experience and training, even more than the details of document formats or approval procedures, will determine whether the environmental process will identify correctly potential negative direct and indirect environmental impacts from Expanded ADP activities.
The staff should meet professional criteria in their educational background and professional experience. They should be professionally trained and experienced professionals who are able to recognize, analyze and solve new environmental problems that may present themselves during the course of the implementation of the Expanded ADP.

The Expanded ADP's professional environmental staff should accumulate experience in the processes operating procedures and technical standards. To do so, this staff should have stability in their positions and the establishment of a process for continuous improvement of the Environmental Process through evaluations and feedback. The CEU and the Principal Contractor should have objective criteria against which to evaluate the effectiveness of the professional environmental staff's work and be able to incentive good work with job stability and pay raises.

Finally, the professional environmental staff operating the Expanded ADP Environmental Process should receive systematic training in its procedures. This training should be provided at the start of Expanded ADP activities and then followed up with additional training during the course of the program. Subsequent training should focus on the lessons learned at the field and central level from the operation of the environmental process and coordination between the environmental units themselves and then between the environmental units and the other entities involved in the Expanded ADP. Table 5.2 provides an illustrative content and schedule for an environmental training program for the staff associated with the Expanded ADP.

Table 5.2. Illustrative Environmental Training Program for the Expanded ADP

Title of Training Event	Purpose	Illustrative Attendees	Dates	Days
Expanded ADP Environmental Process	Introduce the DEVIDA and Contractor staff to the environmental process.	Staff of DEVIDA and Contractor environmental staff.	November 2003	4
Mitigation of Road Impacts	Identify, discuss, & coordinate mitigation measures for indirect negative impacts of road construction & improvement projects.	DEVIDA, Contractor, municipalities, INRENA, Ministry of Transport.	November 2003	3
Municipal Governments in Protected Area Buffer Zones	Identify and discuss means to coordinate municipal governments with protected area management plans, especially in buffer zones.	DEVIDA, Contractor, Environmental NGOs, municipalities, INRENA.	January 2004	2
Workshop on Expanded ADP Environmental Process	Review and evaluate Expanded ADP environmental process based on experiences. Update the process as experiences suggests.	DEVIDA, Contractor	October 2004 – 2007 (once a year)	3
Pesticide Procedures	Present results of Pesticide Environmental Assessment. Discuss its findings and recommendations. Formulate Action Plan.	DEVIDA, Contractor, USAID	June 2004	2
Mitigating Impacts of Small Scale Infrastructure	Identify principal negative impacts, which may result from infrastructure projects.	DEVIDA, Contractor, Ministry of Health. Constructors.	February 2004	2
Rehabilitation of Degraded Soils	Present specific steps required to rehabilitate degraded soils at elevations above 500 meters above sea level. development areas.	DEVIDA, Contractor, USAID and implementers agricultural staff.		4

5.5 Staffing for the Environmental Process

The PEA recommends that the Expanded ADP finance a total of eight environmental professionals specifically for the Environmental Process. Of these, two will work in the GMA, two in the CEU and four in the REU. Their professional background should be forestry and environmental engineering. Outside of the budget for the Environmental Process itself, the Expanded ADP will also finance the part-time work on the Environmental Process of the supplemental professionals assigned from the MEU during the peak construction season.

5.6 Budget for the Expanded Alternative Development Program Environmental Process

The PEA calculates a budget for the operation of the Expanded ADP Environmental Process for five years to be US$6,697.416.

Table 5.3. Expanded ADP 5 year Budget

DESCRIPTION	TOTAL
A. Local Professional DEVIDA	
Professionals GMA (2)	265.230,30
TOTAL SALARIES	**265.230,30**
II FRINGE BENEFITS	122.430,31
III OVERHEAD	222.594,72
IV TRAVEL, TRANSPORTATION	12.500,00
V ALLOWANCES (PER DIEM)	51.500,00
VII OFFICE AND COMPUTER EQUIPMENT	191.311,00
VIII WORKSHOPS AND TRAINING	150.000,00
XI G&A	51.489,21
XII FEE	53.352,78
TOTAL DEVIDA	**1.120.408,32**
A. Long-Term Expatriates	
Forester / Part Time	221.025,25
Subtotal, Long-Term Expatriates	**221.025,25**
B. Short-Term Expatriates	
GIS Specialist	138.140,78
Environmental Specialists	165.768,94
Subtotal, Short-Term Expatriate	**303.909,72**
C. Local Professional	
Central Environmental Engineer (CEU)	
Environmental Engineer	132.615,15

DESCRIPTION	TOTAL
Forest Engineer	119.353,64
Regional Environmental Units (REU)	
Environmental/Forest Engineer (4)	477.414,54
Subtotal, Local Professional	**729.383,33**
D. Home Office Support	
Project Manager	13.123,37
Project Administrator	19.339,71
Field Accountant	8.288,45
Subtotal, Home Office Support	40.751,53
TOTAL SALARIES	**1.295.069,82**
II FRINGE BENEFITS	454.352,01
III OVERHEAD	1.008.948,22
IV TRAVEL, TRANSPORTATION	50.325,00
V ALLOWANCES	284.342,27
VI OTHER DIRECT COSTS	110.004,65
IX. SUBCONTRACT	
Zonification ADP Areas	40.000,00
Certification Forest Management	150.000,00
Pesticide Environmental Assessment	80.000,00
Environmental Assessment & others	500.000,00
Contracts for FMP Local Forest	250.000,00
SUB TOTAL SUBCONTRACT	1.020.000,00
X. G&A	214.108,23
XI FEE	221.857,51
TOTAL CONTRACTOR	**4.659.007,70**
USAID transfer to DEVIDA / Operating Expenses	**150.000,00**
TOTAL / USAID FUNDS	**5.929.416,02**
A. Local Professional Government	
Director GMA	180.000,00
Forester (2)	240.000,00
Secretary	45.000,00
Secretaries (4)	165.000,00
Digitador	30.000,00
Driver (4)	108.000,00
TOTAL GOVERNMENT	**768.000,00**
GRAND TOTAL	**6.697.416,02**
Sustainable Development Grants	
Reforestation after eradication	**6.000.000,00**

ANNEX A

Terms of Reference

A.2 Title

Programmatic Environmental Assessment for ADP

A.3. Objective

General Objective

The overall objective of this PEA is to identify and then to avoid or adequately mitigate the potentially negative environmental impacts of the activities proposed under USAID/Peru's Expanded ADP. The PEA should built on the work, experience and procedures developed to date under the first phase of the ADP, with the purposes of conforming with USAID environmental regulations (a) to collect and analyze baseline information, and (b) to ensure that environmental mitigation measures and activity selection criteria are integrated into the implementation of the expanded ADP activities. The PEA will respond to the recommendations contained in the expanded ADP IEE, as summarized above, and will become an integral component of the design documentation of activities to be financed from INC resources provided from 2002 – 2006. The recommendations of the PEA will also form the analytical framework the section of the ADP-funded Joint Environmental Agenda entitled "Mitigation Measures". The Agenda will be implemented on an annual work plan basis, and this section will track progress in implementing mitigation measures of the various environmental assessments conducted for the ADP.

Specific Objectives

1. Evaluate the effectiveness of past mitigation efforts under the first phase (1995-2201) of the ADP, with a special focus on the adequacy of the guidelines of ContraDrogas' Sistema de Evaluación de Impacto Ambiental (SEIA) and the current environmental monitoring and evaluation systems used by USAID, DEVIDA, and ADP implementing organizations.

2. Collect and analyze relevant baseline environmental information on the Expanded ADP sources zones and consolidation areas.

3. Define the magnitude, direction, location and duration of potential negative environmental impacts on activities.

4. Review existing guidelines and, if inadequate, develop and provide new guidelines (in English and Spanish) for implementing agencies of the Expanded ADP, for systematically evaluating, mitigating and monitoring the environmental impacts of activities during program implementation. Of special are those guidelines and procedures for road rehabilitation, forest concessions, small scale public works, and agricultural production activities.

5. Describe the personnel and estimate the total budgetary resources required for environmental mitigation and monitoring of both direct and indirect impacts of activities during the life of the ADP, and include this information in the proposed life-of-activity work plan for the 'Mitigation Measures" section of the Joint Environmental Agenda.

6. Provide technical criteria for the incorporation of environmental concerns into the implementation of those ADP components identified in the IEE that have a negative determination with conditions, or a positive determination. These include Extension and Information Services, Economic Infrastructure, Protected Area Management Plans, Strengthened Democratic Institutions, and Rapid Response. This will include guidance to USAIDD/Peru, DEVIDA, and other partners to evaluate, avoid or adequately mitigate, and monitor environmental impacts.

7. Summarize the likely indirect impacts (on land use) of the proposed "Roads to Markets Initiative." Develop a baseline map of the existing roads in ADP areas, and those stretches of the major roads to be rehabilitated, to include the critical points for mitigation activities.

8. Conduct an institutional review of the implementing partners as well as Government environmental units responsible for implementing the environmental assessment and mitigation monitoring requirements of the ADP. These will include DEVIDA, the Ministry of Transport, NOO's, and other entities at the national and decentralized levels. Comment on the institutional capability of these units, including quality of technical staff, financial resources, and other assets, to perform their functions. In cases of deficiencies, recommend corrective actions to bring these units up to minimum standards to be able to professionally perform their duties.

A.4 Statement Of Work

Contractor will prepare a programmatic environmental assessment (PEA) which incorporates the recommendations of the IEE for the Expanded Alternative Development Program in Peru. The USAID/Peru Alternative Development Team (SO13), the USAID/Peru Mission Environmental Officer, and environmental experts of the Government’s DEVIDA will provide to the contractor limited assistance and technical advice. The PEA will be prepared by the contractor in accordance with relevant procedures and guidelines described in USAID regulations for such assessments. The contractor will be provided access to these regulations by USAID/Peru' s Mission Environmental Officer.

The contractor shall:

1. Compile and deliver to USAID/Peru and DEVIDA a "baseline inventory" of the Expanded ADP areas which identifies areas of particular environmental concern within the proposed ADP components summarized in the IEE. The inventory should include data on topography, forest cover (e.g. mature forest, degraded forests), proposed and actual protected areas, location of major roads to be rehabilitated, and areas of settlement and agricultural production. USAID/Peru's existing GIS software and hardware will be made available to the contractor in the event such information would be useful. The contractor will need to purchase available satellite images of some of the ADP areas.

2. Using the IEE for the Expanded ADP and other program design documentation, determine whether the contractor agrees with those proposed ADP components that are anticipated to have no direct or indirect environmental impact, and those that may produce direct or indirect environmental impacts.

3. Complete an environmental assessment of the indirect impacts of the major roads to be rehabilitated, identifying environmental mitigation measures and alternatives.

4. Review the proposed section of Marginal Road to be rehabilitated with the first tranche of funding under the Expanded ADP. Comment on the environmental analytical work done to date for this section that focuses on potential direct impacts of construction activities, including the procedures followed and/or capability of the responsible parties to correctly conduct an environmental assessment.

5. For those ADP components with a "negative determination with conditions," propose a broad set of mitigation guidelines to reduce or eliminate direct and indirect environmental impacts. The contractor will review the guidelines in the LAC Environmental Guidelines books for applicability to proposed activities and modify as needed.

6 .For those ADP components which require further environmental assessments, identify reasonable alternatives to the proposed approach described in USAID/Peru's activity approval documentation (see point 1. of "Methodology").

7. As part of the analytical work undertaken during the PEA obtain the opinion of ADP stakeholders through mechanisms and utilizing venues appropriate to the social, political and economic conditions in the Expanded ADP areas. Stakeholders include (but are not limited to) the potential direct beneficiaries of the activities, relevant GOP officials and elected municipal representatives, and civil society organizations. Explain how their opinions inform the development of the recommendations made under the PEA;

8. Propose a monitoring system that is economical, timely, and politically feasible for monitoring the effectiveness of proposed mitigation measures for any ADP component, in response to anticipated direct and indirect impacts. Propose a budget to establish and implement this monitoring system.

9. Review and update the set of environmental manuals or guidelines used under the ADP (SEIA), especially those for road rehabilitation, forest concessions, small-scale public works, and agricultural production activities.

10. Provide recommended language for environmental guidelines to be included in all contracting and grant/cooperative agreement documentation for the ADP.

11. Propose a life-of-activity work plan for the section of the Joint Environmental Agenda entitled "Mitigation Measures," describing the activities to be undertaken and a proposed budget, during the life of the ADP (2002-2006).

Methodology

Working closely with USAID/Peru's Alternative Development Team, other technical personnel, and Mission Environmental Officer, and with relevant DEVIDA and other GOP personnel, the contractor will incorporate the following considerations into the preparation of the PEA:

1. Review the Expanded ADP design documentation: The contractor will review the activity descriptions of the Integrated Regional Development Activity, the Marginal Highway Rehabilitation Activity, and other ADP components, to gain an understanding of the program strategy, implementation mechanisms, and system for measuring results and impact.

2. Utilize Prior Experience in the Expanded ADP Areas: The contractor will consult relevant evaluations and analyses for the development of environmental evaluation, mitigation and impact monitoring recommendations for all proposed ADP components, but with a special emphasis on those requiring mitigation measures.

3. Focus on Identification of Effective Mitigation Measures and Strategies for Conducting Future Environmental Assessments: The contractor, based on a thorough analysis of the potential environmental impacts of proposed activities, will focus on the design of practical, effective mitigation measures.

4. Review the Existing Design Documentation for Road Rehabilitation and Other Economic Infrastructure Interventions: As part of the environmental assessment of proposed economic infrastructure interventions, the contractor will review the adequacy of personnel, procedures, and documentation for this component (and make recommendations for improvements, as appropriate). Of special reference is a study completed in May 2002 on the Environmental Impact on Forests of Roads Rehabilitated under the ADP.

5. Participation of Many Stakeholders: After developing a participation plan in consultation with USAID/Peru and the GOP, the contractor will obtain input from a broad array of stakeholders in the:

a) identification of potential impacts of activities,
b) the review of mitigation measures, and
c) the design of a system of environmental mitigation, evaluation and monitoring.

6. Activities: In order to achieve the objectives, the contractor will undertake the following activities:

a) Review of Available information: The contractor may review and evaluate documentation from USAI, DEVIDA, and other organizations. Such documentation should include: program strategy and design documentation, environmental assessments, the (draft) Environmental Guidelines Handbook for the LAC Bureau of USAID, GOP procedures for monitoring environmental mitigations measures (designated as “SEIA” procedures), trip reports, and evaluations. The contractor may also review and evaluate pertinent reports from other agencies

of the United States government that may be involved in the program areas, such as the Drug Enforcement Administration (DEA), the Narcotics Affairs Section (NAS), the Public Affairs Section (PAS) as well as the United Nations, UNDCP, and other bi-lateral programs. The contractor should consider obtaining satellite imagery of ADP areas to analyze potential land use impacts. The contractor will review existing design documentation for the Expanded ADP, including the Integrated Regional Development Activity and the Marginal Highway Rehabilitation Activity descriptions currently being developed by USAID, as well as proposals submitted by potential implementing organizations in response to ADP needs. For example, proposals have been submitted by potential implementing NGOs under the Joint Environmental Agenda, including those that propose income generating activities focusing on eco-tourism, wood processing, the use of medicinal plants, and the construction of small-scale infrastructure in protected areas and parks;

b) Consultations: The contractor shall consult with members of USAID/Peru's Alternative Development and Environment and Natural Resources Teams, DEVIDA, and other stakeholders, keeping a written record of such consultations, including the names of persons interviewed and the date and place of the interviews for submission to USAID/Peru upon completion of the environmental assessment;

Field Observations: The contractor should make field trips to program areas to observe sites of potential environmental impacts of the proposed ADP components, for the purposes of:

~ Making qualitative interviews with key informants
~ Confirming ecologically sensitive areas
~ Having DEVIDA environmental staff along so they can observe the PEA preparation process.

Such field trips should be planned in consultation with relevant members of the Alternative Development Team and, for security reasons, undertaken only upon the approval of the team;

c) Public Participation: The contractor should conduct or otherwise obtain relevant stakeholder opinions on the draft environmental assessment for the proposed ADP components;

d) Briefings and Workshops: The contractor shall brief relevant members of the Alternative Development Team according to a schedule to be determined in consultation with the team leader and team members. These briefings should occur in Lima among USAID, DEVIDA, and possibly other program partners. During an initial briefing, the contractor will describe the PEA work plan and schedule. The contractor will conduct a workshop during the eighth week of the consultancy, in which the draft report will be presented describing the main PEA findings and recommendations;

e) Reports: The contractor will present a recommended report format by the first week of the consultancy, for review and approval by USAID/Peru. A draft final report will be the basis of the workshop to be held in the eighth week, followed by a final report which incorporates the discussion of the workshop. The final report should be submitted in English (five copies) and Spanish (ten copies).

ANNEX B

List of People Consulted

LIMA

1. Julio Ocaña DEVIDA-Lima
2. Lucio Batallanos DEVIDA-Lima
3. Marco Romero INRENA-Lima
4. Lily Rodríguez CIMA (ONG Cordillera Azul)
5. Enrique Arévalo Instituto de Cultivos Tropicales – ICT/Tarapoto
6. Jorge Malleux WWF
7. Micha Torres Directora de PRONATURALEZA

PROVINCIAS

1. Washington López INADE-Tarapoto
2. César Coral DEVIDA/INADE-Tarapoto
3. Jaime Linares Ex Alcalde de Tres Unidos/Picota-Tarapoto
4. Julio Guerrero Reyna Alcalde de Tres Unidos/Picota-Tarapoto
5. Crispín Pinchi Presidente del Comité Ecológico de Humazapa/Tres Unidos/Picota-Tarapoto
6. Aquiles Ramírez Ex trabajador de Área Ambiental INADE-Tarapoto
7. Consuelo Rivero Secretaria Ejecutiva/AMRESAM-Tarapoto
8. Hugo Núñez Funcionario de AMRESAM-Tarapoto
9. Esaú Hidalgo Funcionario de AMRESAM-Tarapoto
10. Luis Benítez INRENA/Áreas Protegidas-Tarapoto
11. César y Max Rengifo SEDISA- Tarapoto
12. Fernando Arévalo Rengifo Ministerio de Agricultura/Director de Promoción Agraria-Tarapoto
13. José Santisteban Tello Ministerio de Agricultura/Gerencia de Recursos Naturales –Tarapoto
14. Ing. Leiva SENASA-Tarapoto
15. Oscar Pinelo INRENA-Tarapoto
16. Arthur van Lewen SNV-Tarapoto
17. Wilson Reátegui Trigozo Administrador Técnico Forestal y Fauna Silvestre/INRENA-Tarapoto
18. Alfredo Rojas Jefe PETT
19. Ing. Moreno INADE/Bellavista-Sacanche-El Eslabón/San martín
20. Víctor Neyra Fernández Alcalde de Pasarraya/Bellavista/San Martín
21. Leonardo Perdomo Sol Alcalde de Sacanche/Saposoa/Juanjuí
22. Hugo Tavera Ramírez Relacionista Público Alcaldía de Saposoa
23. Miguelita Vásquez Ruiz Regidora de Población y Salud Ambiental Alcaldía de Saposoa
24. Justo Mayta Quispe Challuayacu/Pólvora
25. Esteban Delgado DEVIDA-Tocache
26. Miguel Herrera Pereda Director PEAH-Tingo María
27. Hugo Barbajelata Coordinador de la Comisión Ad-Hoc para Concesiones de Huánuco, INRENA-Tingo María

28. Braulio Andrade WWF-Aguaytía
29. Rodolfo Valdivieso Consultor WWF-Aguaytía
30. Elena Trigozo Presidenta Asociación de Mujeres Campesinas de Ucayali-AMUCAU-Pucallpa
31. Carlos Romero Concesionario- Pucallpa-Beneficiario WWF
32. César Guerreo Saavedra Gerente de Asociación de Extractores Madereros y Reforestadores de Ucayali
33. Giaccomo Franccini/Guiomar Seijas Concesionario Pucallpa
34. Tomás Benavente Concesionario de Aguaytía-beneficiario WWF
35. Luis Maguiña Alcalde de Aguaytía
36. Flavio Sánchez Dirigente Cocalero

ANNEX C

Case Study No. 1: Puente Humazapa-San Juan Road Project

Purpose

The purpose of the Case Study was to evaluate the effectiveness of the System for Environmental Impact Analysis (SEIA) that was established for the Alternative Development Project by ContraDrogas in 1995 in achieving compliance with Peruvian and USAID environmental regulations. This evaluation will provide the team that is preparing the Programmatic Evaluation Team with the elements upon which to base its recommendations for improving the effectiveness of the environmental procedures to be utilized for the operations of the Expanded Alternative Development Program.

Methodology

The Puente Humazapa-San Juan road was selected for the case study for several reasons. First, the Team Leader had already visited the project in May of 2002. He therefore already had a first-hand knowledge of the site. Second, since the rehabilitation and improvement of penetration roads had already been identified as the principal source of negative impacts on tropical forests resulting from ADP actions, it was judged necessary to use a road rehabilitation project for the case study. Finally, the area of Tres Unidos, where Puente Humazapa is located, unlike most of the rest of the Alternative Development areas, was free from conflict at the time the selection was made.

The Case Study occupied a total of 15 person days. A three-person team, consisting of a forester, geographer and rural sociologist, initially discussed the Puente Humazapa-San Juan road with the staff of the Special Project for the Central Huallaga (PECH) of the National Institute for Development (INADE), the institution which supervised the project. This group then spent from Thursday through Sunday in Tres Unidos. The forester and geographer walked approximately 5 km to each side of the road in order to observe land use practices, identify prevalent forest types, and make a rough visual estimate of timber volumes per hectare. The rural sociologist spent these days conducting interviews with knowledgeable informants in Tres Unidos and San Juan. On Sunday the Team Leader and Civil Engineer also arrived in Tres Unidos. The five person team organized and led a two hour meeting with leaders of the Tres Unidos and San Juan area in which the advisability and feasibility of the establishment of a Local Forest in the municipality of Tres Unidos was the main topic of discussion.

Project Background

The project is located in the District of Tres Unidos, Municipality of Picota, Province of San Martin on the western side of the Huallaga River. Tres Unidos is a political district created in 1965 that lies within the municipality of Picota. The total area of the sub district of Tres Unidos is 24,652 ha. The boundaries of Tres Unidos begin on the east at the boundary of the Cordillera Azul National Park. The northern and southern boundaries follow the natural landmarks such as rivers and ridges down to the Huallaga River.

The total population is 2,431 based on a census of 1983. Agriculture is the predominant economic activity.

The soils of Tres Unidos vary with altitude. At the lower elevation, below 500 meters above sea level, the soils are mostly alluvial. Between 500 and 2,200 meters above sea level the soils are mostly acid and have toxic quantities of aluminum. The Peruvian Institute for Natural Resources (INRENA) has classified these later soils as suitable only for forests, not for pasture or agricultural production.

In spite of its relatively small area of soils classified as suitable for agricultural use agriculture is the predominant land use within Tres Unidos. On the flatter areas and more gentle slopes coffee production has become predominant in the last decade, thanks in part to promotion by extension agents whose work was financed by the Alternative Development Program. On steeper slopes, including the side slopes of canyons, the predominant crop is hard corn. Within the remaining forest in areas both close to and as much as 5 km away from the road there are “chacras” with crops of yuca, banano, coffee and guava. The typical “chacras” is between 2 and 4 ha in size. All the farms have forest cover in various stages of regeneration. Most of the farms still have patches of the original primary forest as well. Farmers use the wood from these secondary and remnant primary forests for building the structure of their houses. The common palm is utilized for house thatching. The only wood commonly extracted for sale is “tornillo.” Wild game found in the forest is an important source of food for many of the residents.

The population of Tres Unidos is sharply divided between the “lugareños” and the migrants. The “lugareños” are the people who have lived in Tres Unidos for a longer time, at the lower elevations. The migrants have arrived in the last few years concurrently with the road project and have colonized the forested areas in the upper watershed above the caserío of San Juan. There is an active land market operated by people who specialize in claiming larger areas of unoccupied land and selling off rights to its occupation in smaller lots to immigrants. Although the political authorities of San Juan claim to have control over the influx of immigrants, in interviews residents noted that every day truckloads of new immigrants arrive, mostly from the Sierra with all their possessions including their livestock. Many immigrants are also entering the upper area of Tres Unidos from the area of Sauces to the north and Paraíso to the east. Most of these immigrants arrive with their land already bought. There is a marked difference between the incomes of the migrants and the “lugareños.” The migrants, it is said, have higher incomes because they work more hours in the day and involve the whole family, including women and children, in agricultural work. The “lugareños” describe the migrants as “working like mules.” The “lugareños,” by contrast, keep their children in school rather than working in agriculture.

Description of the Project

Mr. Jaime Linares García, who was the mayor of Tres Unidos from 1998 to 2002, promoted the Tres Unidos – San Juan road. The residents of Tres Unidos give him credit for persuading the PEHC to finance this road rehabilitation project. The feasibility studies, however, were financed by the Regional Government and carried out by PEHC. USAID financed the project almost entirely.

According to the Technical Analysis (Expediente Técnico) the road project was undertaken the purpose of the project was to "…promote the integration of the different villages and to provide access to basic services to their inhabitants." This purpose indicates that it was as much or more a social than an economic investment. The Expediente Técnico contains no financial or economic justification for the project more specific than that it would "increase access to markets for the agricultural production."

The first segment of the road was from kilometer 0.0 to kilometer 5.0. The second segment was from kilometer 0.5 to kilometer 10.620. Approximately, from km 00 to km 7.0 the rehabilitation project used an existing "trocha" as its base which had been built by a logger. From km 7.0 to km 10.65 the project constructed an entirely new road, although the village of San Juan was formerly accessible by a mule trail which can still be seen. The road starts at the Humazapa bridge, located approximately 2.5 km from the village of Tres Unidos. The total length is 10.68 km. The width of the road is 5.5 km with a usable surface of 4.5 meters. The road ends in the "caserio" of San Juan at an elevation of 763 meters above sea level. The road utilized the standards for third order road set in by the "Consejo Transitorio de Administración Regional of San Martin" for this type of road.

The project includes no bridges. It does include culverts, badenes, and drainage ditches, both cemented and without cement. The maximum grade is 8.6 %. The drainage ditches are triangular with the dimensions of 1.00 X 0.50 m. The diameter of the culverts is 0.94 m. The minimum radius is 25 m. The subsurface was designed to support light trucks that would transport sacks of coffee. The project was designed in 2 segments, and 4 Technical Analyses. The project was approved in October of 2000. The total budget was approximately $594,846. The cost per km was US$55,700.

Analysis of the Environmental Impact Study (EIA)

For the following reasons, the EIA for the Puente Humazapa-San Juan Road Project does not adequately meet the requirements of USAID Environmental Regulations:

- The study assigns numerical ratings, on a scale from 1 to 5, to the impact of the project on 15 environmental variables, such as water, soils, flora, fauna, and socioeconomic factors. The positive impacts totaled 257 points and the negative points 207 points. First, it includes environmental parameters that have little to do with the proposed actions such as, for example, air contamination. Second, the rating was done without any basis in field data. Thus this numerical rating system although perhaps superficially objective, in fact is a completely subjective. It does not result in the identification of significant issues. In fact, it obscures the significant issues by submerging them in irrelevant and misleading numerical calculations. USAID Environmental Regulations require the identification of significant environmental issues connected to a proposed action, so that measures can be taken to avoid or mitigate them during project design or implementation.

- There is no indication in the EIA that any type of public consultation was held or incorporated into the study. Public participation, although not absolutely required by USAID

Environmental Regulations, certainly is encouraged. Given the many interests surrounding the Puente Humazapa-San Juan Project, such as land speculation, water rights, logging interests, and political motivations, public consultations would have greatly improved the content of the EIA, thereby making it a more effective document for avoiding and mitigating negative impacts on tropical forests and biodiversity.

- The EIA was sent to the Director of the Environmental Unit for review and approval on November 22, 2000, while the technical design documents were concluded and approved in October 2000. Thus the Technical Document (Expediente Técnico) was approved before the environmental analysis was even prepared much less reviewed and approved USAID Environmental Regulations clearly require that an environmental assessment be prepared and approved before a project is given final approval. The environmental assessment is supposed to be a contribution to the decision-making process, not a perfunctory paperwork exercise, done simply to satisfy bureaucratic requirements, as was clearly the case for this EIA.

- The Puente Humazapa-San Juan Road project was divided in two segments, from km 0.0 to km 5.0 and from km 5.0 to km 10.6. The EIA covers only the first portion of the project. No type of environmental analysis was made for the second portion of the road which, in fact, was the section that required the construction of a new road and which penetrated into areas with remnant primary forest patches and steep slopes. USAID Environmental Regulations do not permit that an environmental assessment that covers only one section of a road be utilized to comply with the environmental review requirements of the entire road. Furthermore, USAID Environmental Regulations place special emphasis on avoiding or mitigating the negative impacts of road projects on tropical forests.

- The EIA was never actually utilized. The engineer who was assigned responsibility for the environmental mitigation measures only knew of the EIA existence because the PEA Team showed it to him. He had in fact supervised the environmental mitigation measures for the road without ever having read or even known about the EIA. The Special Project Environmental Unit staff could give the PEA Team no explanation for this curious non-use of the EIA.

- The EIA does not adequately address the principal indirect negative impacts of the road project, increased elimination of tropical forest. It does list deforestation as a negative impact. But it also classifies the expansion of the agricultural frontier as a positive impact. The two obviously occur on the same sites. These classifications are re not based on field observations. Moreover, the EIA provides no measures to avoid or mitigate the negative impact of deforestation. Thus the most significant, long-term, irreversible negative impact from the project, and the one that USAID Environmental Regulations specifically require be thoroughly considered, received essentially no serious analysis in the EIA.

- The report discusses the direct negative environmental impacts of the project but without sufficient detail to allow the implementation of effective mitigation measures. For example, it mentions the necessity of employing a pre-determined disposal site for construction debris but does not specify the most adequate sites in order to minimize potential impacts. Consequently, the PEA Team observed debris in and around the road and even on top of

forest lands. The EIA also mentions the fact that the construction activities should not alter the course of creeks or any other bodies of water. However, it fails to mention how they can avoid having to alter water courses or its potential consequences on road durability. Consequently, culverts have been used to drain road drainage ditches instead of their used to allow the passage of water from creeks and other water bodies crossing the road.

- The Technical Document classifies the first segment of the project as road rehabilitation and the second segment as road improvement. In fact, the evidence indicates clearly that the project actually involved the construction of a new road. First, residents in Ssan Juan, at the end of the road, informed members of the PEA Team that no vehicular road had previously reached existed. Second, according to project records the movement of earth from km 0.0 to km 5.0 exceeded 82,000 cubic meters, far more earth movement than would be required for the rehabilitation or improvement of an existing road. Third, the original animal trail going straight line up the mountain can still be observed; its location does not correspond to that of the new road. Fourth, the project cost $55,700/km, or over three times more than the normal cost for even the construction of a rural road of between $15,000 to $18,000/km as estimated by the Peruvian Ministry of Transport.

Conclusions and Recommendations

The Puente Humazapa-San Juan Project Case Study gives clear indications that ContraDrogas' SEIA was ineffective under the first phase of the ADP. Its guidelines and procedures proved to be entirely inadequate for ensuring compliance with USAID or Peruvian Environmental Regulations. The PEA Team found no reason to believe that the environmental Puente Humazapa-San Juan Project is atypical. Indeed, the study Impact on Natural Forests and Protected Areas of the Improvements in the Road System Financed by USAID/Perú in the Alternative Development Valleys found that the SEIA had not adequately provided for the evaluation and mitigation of road improvement projects during the first phase of the ADP anywhere in the alternative development areas.

The Case Study indicates that the content of the SEIA should be revised and its implementation procedures reformed along the following lines:

- USAID and DEVIDA should supervise the approval of projects more closely. They should not rely on approvals given by other institutions especially when they are also the institutions that have proposed the project. In the Case Study the Central Huallaga Special Project proposed the road project and prepared and supervised the EIA. The conflict of interest is obvious. Consequently, USAID and DEVIDA should be more directly responsible for approving the environmental evaluations rather than delegating that authority.
- USAID and DEVIDA must assign clear roles and responsibilities for the implementation of the SEIA, especially for the evaluation and implementation of environmental mitigation and monitoring activities. The Case Study indicates that responsibilities for the operation of SEIA are unclear. The PEA Team received no adequate explanations for the ineffectiveness of the SEIA in this case. Nobody could say why the EIA had been prepared after project approval had occurred, why the engineer responsible for supervision of the environmental mitigation measures had never received a copy of the EIA, or why the EIA covered only the first but not

the second segment of the project. Accountability for compliance with the SEIA appears to be almost completely absent. So much delegation for the environmental evaluation and follow-up on the mitigation measures that nobody takes responsibility.

- The environmental aspects of a proposed project must become an integral part of project design, not an afterthought. If a project has been determined to need an environmental assessment, this should be prepared before the technical documentation is prepared. The approved environmental impact study should become a prerequisite for project funding rather than an add-on piece of paper. In the Case Study, the EIA served absolutely no real purpose other than to superficially comply with USAID Environmental Regulations. Why waste time and money on such paperwork exercises that accomplish nothing?

- Compliance with USAID and Peruvian Environmental Regulations will not be taken seriously unless they form part of contracts and non-compliance results in financial consequences. The Case Study indicated that none of the involved institutions, including USAID, ContraDrogas, the Central Huallaga Special Project, took the environmental regulations seriously. They knew that it would not make any difference if they did or not and they have been proven correct – the project was completed without environmental compliance and there have been no consequences for any of the institutions involved. The contracts for USAID funds between implementing partners and USAID/DEVIDA should contain language to the effect that USAID Regulations 216 as well as GOP Regulations should be observed at all times and that failure to comply with these regulations would be ground for stopping the project funding.

- All projects approved by USAID or DEVIDA should have a monitoring and evaluation plan. Such monitoring and evaluation will provide the information required for determining if the required mitigation measures are effective. USAID Grant Manager should make sure that the same is properly funded and that the implementing partner has allocated a sufficient budget to the implementation of the plan. In the Case Study, the project has no monitoring and evaluation even though it has only recently been completed. Consequently, there are no data that would indicate the environmental impacts of the project or the effectiveness of the mitigation measures that were implemented.

- The EIA should be prepared by a team of professionals with amply and appropriate experience. The single most significant environmental issue raised by the Puente Humazapa-San Juan project concerned the use by people of the remaining forest along the future road. Yet the team that prepared the EIA consisted of a biologist, two civil engineers, and an agronomist. There was no forester or sociologist.

ANNEX C

Case Study No. 2: Saposoa Irrigation Project

Purpose

The purpose of the Saposoa Irrigation Project Case Study was to evaluate the effectiveness of past mitigation efforts under the first phase (1995-2001) of the Alternative Development Program (ADP), especially the adequacy of ContraDrogas' System for Environmental Impact Analysis (SEIA).

Methodology

In order to gather first hand information for the Case Study the four members of the PEA Team (team leader, forester, civil engineer and geographer) spent six hours in Saposoa. They observed the principal structures of the irrigation system, including the two diversion dams on the Saposoa River, the principal distribution canal and several of the secondary canals. They observed the use of the irrigation water for irrigation of rice fields. They also interviewed the engineer responsible for the construction of the irrigation project's structures. All the members of the PEA Team reviewed the Technical Document (Expediente Técnico) and the Environmental Impact Study.

Project Background

The Saposoa Irrigation Project is located in the districts of Saposoa, Piscoyacu, El Eslabón and Sacanche in the Municipality of Saposoa, Province of Huallaga, Department of San Martin. The project is intended to provide irrigation water to 2,200 hectares of valley bottom alluvial soils on the south bank of the Saposoa River in order to increase agricultural and livestock production and therefore the socioeconomic welfare a population of 4,423.

The project consists of diverting 2.75 m3/sec of water from the Saposoa River into a principal distribution canal. The principal distribution canal is designed to be 26.10 km long and will feed water to 14 secondary canals that have a total projected length of 24 km. The project also involves the construction of culverts, aqueducts, bridges, draw off structures, channels, and direct inlets. On-farm irrigation is to be by surface flooding.

The first two segments of the principal distribution canal were constructed in 1988. In 1998, a diversion dam on the Saposoa River and associated water intake structures were completed. The diversion dam was designed for a maximum river flow of 500-600 m3/sec. During the 1998-9 rainy season the flow in the Saposoa River rose to over 1,200 m3/sec and destroyed the newly constructed diversion dam. The main channel of the Saposoa River also shifted at the site of the diversion dam. Reconstruction of the diversion structure thus required the construction of an additional dam in order to divert the entire flow of the Saposoa River back to its previous channel and make it possible to utilize the water intake structure. The reconstruction of the diversion structures cost something over US$500,000.

The Environmental Impact Study (EIA)

The Environmental Impact Study for the Saposoa irrigation project is in two parts and is dated March 2002. Part I is the Environmental Diagnosis, which include an introduction and an environmental diagnosis of the Project. Part II is the Identification of the Environmental Impacts, consisting of an Analysis of the Environmental Impacts, Environmental Management Plan, Environmental Valorization, Conclusions and Recommendations and Complementary Information.

Part I is entirely descriptive. It describes the background of the project. Then it describes the methodology for preparing the EIA, through the use of a cause and effect matrix. Next it presents the "Environmental Diagnosis of the Project" whose purpose is to "…determine the pre-operational status…" of the project area. This section includes Table No 1, which lists the probable alternations resulting from the actions and phases of the Saposoa irrigation project. It has four columns: Environmental Parameter, Alteration, Project Actions and Phases of the Project. The Environmental Parameters are Climate, Air, Noise, Hydrology, Soils, Geology, Vegetation, Fauna, Landscape and Socioeconomic. The alterations consist of such things as direct destruction, compaction, erosion, loss of water, microclimate changes, and increase in noise. Finally Section I provides a description of the climate, soils, population, electrical lines, and economy of the project area.

Section II is the analytical part of the EIA. It has five sections. The first is entitled Analysis of the Environmental Impacts. This section repeats in text what was already indicated in Table 1 in Section I, with the potential effect and magnitude of the proposed impact on the same 10 environmental parameters. Table 2 in this section rates the "Magnitude of the Impact" on a scale from "Very Low" to "Very High." Table 3 lists the same 10 environmental parameters and impacts and then rates them for their "Tendency" from "Very Low" to "High."

The second section is the "Environmental Management Plan." Its objectives are to orient actions to "…prevent, control, attenuate or compensate the probable environmental impacts that could be caused by the actions…" undertaken during the construction and operation of the irrigation system. The Environmental Management Plan consists of: (1) the designation of a responsible person for implementing the plan called the Internal Environmental Auditor; (2) The Environmental Monitoring Plan; (3) the Preventive/Corrective Action Plan; (4) the Abandonment and Restoration Plan; and (5) the Contingency Plan. The Environmental Management Plan contains three mitigation actions: (1) protection of the margins of the river and the principal canal (S/7.112); the stabilization of cuts (S/15,998); and environmental education (S/2,414).

After this section Table 4 estimates the "Mitigability of the Impacts" on a scale of "Slightly Mitigable" to "Totally Mitigable." Table 5 then repeats the same environmental parameters in its first column, lists the impacts on those parameters in the second column. In the third column it estimates the magnitude of the impact in terms of very low, medium and high. In the fourth column it estimates the extent to which the impact can be mitigated on a scale from little potential for mitigation to completely complete susceptibility to mitigation.

Analysis of the Environmental Impact Study (EIA)

The EIA is not an effective document for identifying and mitigating negative environmental impacts and thus does not comply with the requirements of USAID or Peruvian Environmental Regulations, for the following reasons:

- The EIA was prepared in 2002. By that time the Saposoa Project had been designed and its construction was well underway. The EIA, therefore, contributed nothing to its design or implementation. USAID Environmental Regulations require that the evaluation of environmental impacts for a proposed action occur before the proposed action is undertaken, not subsequently in order to allow for the incorporation of environmental concerns into the design and implementation of the action.

- The EIA utilizes an analytical methodology that subjectively weights a list of potential issues. Most of the potential issues, however, have no connection to the proposed actions and, therefore, receive a rating of "Very Low Impact." For example, 7 "Impacts" are listed under the Category of "Vegetation": Direct destruction of Vegetation, Alteration of Species Population, Destruction of Protected Species, Accumulation of Lead, Trampling of Vegetation, Loss of Productivity due to the Emission of Particulates." All of these receive a rating of "Very Low Impact." None of them, however, is affected by the proposed actions. This system of rating thus provides a false impression of objectivity in the analysis of the potential negative environmental impacts of the project. It does not, therefore, comply with the requirement of USAID Environmental Regulations for an analysis that links environmental consequences with proposed actions.

- The EIA methodology masks the potentially significant issues with many insignificant issues. It does not, for example, does not even list as a potential impact the fact that the diversion structures have blocked the upstream migration of fish that have traditionally been an important food source for upriver human populations. Nor does it discuss the potential for destruction of the diversion structure and consequent severe flooding down river. Although it does list as an "Impact" the "Spatial Redistribution of the population" it rates this issue as "Regular." In fact, in one area of the project, half of the target population has already sold its land to one person (who is rumored to be in the illicit drug business) and moved to higher elevations where they will undoubtedly clear montane tropical forest. The EIA does not mention any of these significant negative environmental impacts much less propose effective avoidance or mitigation measures. It does not, therefore, comply with the requirement of USAID Environmental Regulations to identify significant environmental issues and proposed effective mitigation measures for negative impacts.

- The "Plan de Gestión Ambiental" proposes mitigation actions that are (1) unrelated to significant environmental issues; (2) are on such a small scale as to be insignificant in relation to the negative impacts. It proposes (1) reforestation of 20 ha and (2) 15 participatory workshops. The Plan provides no justification for the selection of these mitigation measures. They are unrelated to the significant environmental issues identified by the PEA Team, such as blocking of fish migration or movement of intended project beneficiaries into the upper watersheds. They are even unrelated to the only impact that the EIA itself rated as "High,"

the "Loss of Productive Land." The Mitigation Plan thus fails to comply with the requirements of USAID Environmental Regulations for the design and implementation of effective mitigation measures for the negative environmental impacts caused by proposed actions.

Conclusions and Recommendations

The Saposoa Project Case Study indicates that ContraDrogas' SEIA was ineffective in e ensuring compliance with USAID Environmental Regulations. The EIA served no useful purpose. The 20 ha of reforestation and the community meetings that it produced as mitigation measures could have been planned and implemented without going through the paperwork process of the EIA.

On the basis of this Case Study the PEA Team recommends that the content of the SEIA should be revised and its implementation procedures reformed along the following lines:

- The EIA should be prepared before or concurrently with the Technical Documentation (Expediente Técnico) not subsequently. Otherwise its recommendations cannot contribute to the design and implementation of the project. In the Saposoa Project inadequate environmental information about the maximum water flows in the Saposoa River, resulted an additional project cost of over US$500,000. The SEI process should be revised to make sure that the EIA is prepared before or concurrently with the final project design.

- Consultation with local informants is an important part of the EIA process. If the EIA had included information from local informants regarding the two main negative impacts of the project could have been identified and avoided. First, local informants could have made the designers of the project aware that the Saposoa River had fluctuated widely in its flow levels. This information would have resulted in a design for diverting water into the principal irrigation canal that did not require a huge diversion dam. Second, consultations with the intended beneficiaries could have indicated that if the price for land were to rise, due to the prospect of irrigation water, a large portion of them would be willing to sell their land and move to the upper watershed. Appropriate mitigation measures could have been taken. The SEIA should be revised to ensure the effective incorporation of consultations with local informants.

- The analytical method utilized for the Saposoa Project does not identify the significant negative environmental impacts so it is of little practical use for formulating effective avoidance or mitigation measures. The subjective evaluation of potential impacts against an arbitrary list of environmental parameters obfuscates rather than clarifies the significant negative environmental impacts. This analytical methodology does not comply with the requirements of USAID Environmental Regulations. The SEIA process should be revised to incorporate the procedures required by USAID Environmental Regulations.

ANNEX C

Case Study No. 3: Sustainable Forestry Development and Institutions

Although the fact is routinely taken for granted, trade – which is the voluntary and mutually beneficial exchange of goods and services – can take place only within a framework of enabling institutions. Property rights are an essential feature of this institutional framework. That is, the prerequisite for buying and selling, which are advantageous for customers and suppliers alike, is that everything being bought and sold must belong exclusively to someone and, moreover, owners must be free to dispose of their possessions as they see fit – consuming them, exchanging them for money or other goods, or simply giving them away at no charge. Where property rights have been established, trade happens and, as a result, living standards rise.

Just as the market economy cannot exist without property rights, conservation of natural resources is virtually impossible without ownership interests in the environment that are both exclusive and transferable. The environmental degradation that occurs if property rights are entirely absent was first characterized 35 years ago by Garrett Hardin as a "tragedy of the commons." Any single user of an open-access resource – from which, by definition, no one is excluded – appreciates that he will capture the benefits of resource exploitation while the costs associated with depletion will be shared. In other words, the benefits are internalized while, from the perspective of the individual user, the costs of resource use comprise a negative externality. Under these circumstances, over-exploitation expands up to the point where all environmental values are completely dissipated (Hardin, 1968).

Examples of the tragedy of value-dissipation caused by the institutional vacuum of open access are everywhere. One of these is over-fishing of a marine fishery over which no single nation or group of nations exercises effective control. Likewise, excessive grazing of rangeland that any herder is free to use is a classic tragedy of the commons. So is excessive logging in open-access forests.

Nobel laureate Douglass North, an economic historian, has documented that, with time, property rights have been created, thereby reducing the environmental damage caused by open access. The pace of institutional change depends in part on the benefits of property rights, which go up as population growth and economic expansion cause resources to grow more scarce. Institutional change is also accelerated by technological improvements that lower the cost of specifying and enforcing property rights (North and Thomas, 1973). As the twentieth century drew to a close, for example, global positioning system (GPS) receivers started being used to delineate property boundaries in various settings where ownership was previously very tenuous. Simultaneously, computerization of land registries allowed holdings to be recorded and transferred more easily. In the years to come, property rights are bound to spread as scarcity mounts, specification and enforcement costs fall, or both.

While the establishment of exclusive and transferable ownership is a fundamental and effective response to the tragedy of the commons, the creation of attenuated property rights can exacerbate certain kinds of environmental damage. In Latin America's tree-covered hinterlands, for example, agricultural use was long a prerequisite for informal or formal tenure. To this day, a *certificado de posesión* is easier to obtain for an untitled parcel in the Peruvian Amazon if crops are being produced on that parcel. Indeed, titling of forested land is not possible under existing legislation. Under these circumstances, no settler has an incentive to conserve tree-covered habitats. To the contrary, positive incentives exist for deforestation.

In addition to biasing land use, property rights can be attenuated in a temporal sense. Before passage of Peru's 2000 Forestry Law, private interests in tree-covered land in the eastern part of the country consisted of short-term concessions in small areas, a typical concession covering 1000 hectares and lasting for just one year. Needless to say, a firm or individual with this sort of temporary ownership could not be expected to make investments needed to enhance the quality of timber resources in the long term. To the contrary, the incentive was to extract logs, especially those of high value, as expeditiously as possible, with no regard for the damage done to remaining vegetation. As more than one individual interviewed for this report pointed out, the old concessions should not be regarded as a form – albeit an imperfect one – of forest property. Instead, the old system was little more than a mechanism for making harvested timber, which otherwise would have been illegal contraband, licit goods.

The new Forestry Law represents a major step toward the sort of property rights needed for the wise use and management of natural resources. In particular, the extension of concession terms to 40 years allows concession-holders to internalize more of the benefits of good management. Thus, sustainable development is encouraged.

Although concessions were first awarded in March 2002, the area adjudicated under the new system is extensive: 1.1 million hectares in Madre de Dios and 2.0 million hectares in Ucayali, to be specific. Additional concessions in these two departments as well as in Huánuco, Loreto, and San Martín will be created in the near future.

A frequently voiced concern about the new system relates to limited competition over available concessions. In Madre de Dios, for example, 93 bids were submitted in 2002, of which 43 were successful. In other words, there were slightly more than two firms competing for every concession. The ratio was even lower in Ucayali: 150 total bids versus 92 winners. These ratios suggest that, at the local level, access to forests is being monopolized.

Lack of competition drives down the value of standing timber, which in turn weakens incentives to manage forest resources as if they are truly scarce. To attract more bidders for each tree-covered holding, changes can and should be made in the concession system. Currently, 80 percent of the evaluation of an individual offer is based on the firm's technical proposal, with 20 percent reflecting its financial offer – i.e., the yearly *canon* that the firm offers to pay annually for each hectare of the concession. Part of the technical proposal reflects the bidder's processing capacity. This creates a clear advantage for whatever mill-owner happens to be established already in the vicinity of the concession. Also included in the technical proposal is a detailed

forest management plan. Since preparing such a plan is costly, some potential competitors are discouraged from bidding for concessions.

Any benefits that result from giving added weight to firms with local processing capacity are undoubtedly outweighed by disadvantages created by limited competition and low stumpage values. Accordingly, this capacity should be dropped from the list of evaluation criteria. Likewise, INRENA, which administers the concession system, should consider specifying forest management criteria as an alternative to asking bidders to develop management plans entirely on their own. Successful bidders, then, would be those offering the highest payment for access to timber resources while respecting the management criteria on which INRENA has decided previously.

Aside from making reforms to promote competition over concessions, national authorities should re-examine the balance being struck between the rights of concession-holders and the claims of local communities. To be sure, indigenous land rights have consistently been respected as concessions have been delimited. The same consideration ought to be given to other groups as well. An important advantage of recognizing local rights in tree-covered land is that local communities often manage forests so as to safeguard environmental services, such as watershed conservation (Poteete and Ostrom, 2002). In contrast, the interest of loggers in these services tends to be modest. Also, if a local community or government is given an ownership interest, the earnings generated by sustainable timber harvesting can be used to fund local education, infrastructure development, and so forth.

Neglecting local claims is probably not an option in the Peruvian Amazon. If forest dwellers perceive that their interests are being shortchanged, then they may block access to concessions or simply invade them. Furthermore, the international certification on which so many forestry initiatives depend will not be obtained if these initiatives appear to be socially conflictive. In light of these realities, fairly accommodating the interests of local communities is essential.

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Financial and Economic Analysis of Irrigation Development: The Case of Saposoa

Evaluation of an irrigation project involves comparison of the net benefits of the incremental agricultural production made possible by providing more water to farmers with the costs of building, operating, and maintaining canals, pumps, and related infrastructure. Also needing to be considered in an economic analysis are environmental costs, which may result from the impoundment and diversion of water as well as the degradation of irrigated land.

If an irrigation project is large enough to have an impact on market values, then this impact needs to be taken into account in the economic analysis. As is explained in any standard guide for evaluation, large projects augment net social welfare (NSW) – which can be depicted as the area between the demand and supply curves in markets in which irrigated output is sold – by increasing agricultural supply. In this case, the net benefits of irrigation consist of the NSW increase.

Since the project in Saposoa will only irrigate 2,200 hectares, market values will not be significantly affected, even at the sub-national level. As a result, net benefit estimation, for economic as well as financial analysis, can rest on the assumption of exogenously determined prices. One analytical approach begins with forecasts of output- and input prices during the life of the project. These prices are then multiplied by projections of future production and input use to obtain annual net returns. For example, it is anticipated that irrigation in Saposoa will allow the rice crop that is planted and harvested during the rainy season (average yield of 2.5 to 3.5 metric tons per hectare) to be complemented by a second crop of comparable size during the dry season, which begins in May and concludes in September or October. In any single year, then, annual net returns will comprise dry-season output multiplied by the price of rice less the opportunity cost of inputs used during the dry season.

Once calculated, annual net returns must be discounted and then added together to produce a single number – the present value of the project's net benefits. If this present value exceeds discounted infrastructure and environmental costs, then the net present value (NPV) is positive, which indicates that the project is efficient. Rather than arriving at the NPV, an internal rate of return (IROR) for the project can be calculated. Efficiency is indicated by an IROR that exceeds a target level (e.g., 15 or 20 percent).

Forecasting prices, output, and input employment for several years into the future is always problematical. Accordingly, it always makes sense to calculate efficiency indicators – a benefit-cost ratio (i.e., the present value of a project's benefits divided by the present value of its costs), NPV, or IROR – using alternative assumptions and projections. This is called sensitivity analysis. Of course, finding that a project's NPV is positive or its IROR exceeds the target return for a wide range of circumstances strengthens one's conviction that the project is truly efficient. In contrast, one might find that slightly lower output prices or production levels causes the NPV to swing from positive to negative or the IROR to fall below the target. If this is the case, the conclusion that the project is efficient may be shaky. Redesign of the project may well be in order.

As an alternative to calculating annual net returns, which requires a lot of data and rests on a number of assumptions, someone carrying out a financial or economic analysis can use real estate values to estimate the discounted net benefits of irrigation. Under normal circumstances, the positive difference between prices paid in competitive markets for farmland receiving reliable, year-round supplies of water and prices paid for non-irrigated land equals the value to be compared with discounted infrastructure and environmental costs.

While this approach has been used in numerous evaluations, care must be taken with the interpretation of irrigation premiums in the Peruvian Amazon. For one thing, participants in the local real estate market are few enough and transactions infrequent enough to call into question how competitive that market really is. If it is not competitive, then the price of any given parcel may differ from the net present value of future production. Something else to keep in mind is that the laundering of drug money may artificially inflate local real estate values, generally, and the premium paid for irrigated farmland, specifically.

With these qualifications and reservations in mind, the discounted net benefits of irrigation in Saposoa have been estimated by multiplying the area to be irrigated by the local irrigation premium. For land with good road access, that premium is approximately $450 per hectare: (S/. 2000/hectare for irrigated land - S/. 400/hectare for non-irrigated land) ÷ exchange rate (S/. 3.5 ÷ $1). For land without such access, the premium is around $325 per hectare: S/. 1500/hectare for irrigated land - S/. 350/hectare for non-irrigated land) ÷ exchange rate (S/. 3.5 ÷ $1). If a premium of $400/hectare is assumed, then the discounted net benefits of irrigation are:

discounted net benefits = 2,200 hectares x $400/hectare = $0.88 million

This estimate of discounted net benefits is comparable to the project's capital costs. The latter comprise two expenses, one relating to construction of the dam on the nearby river where water diversion is to occur and the other relating to the primary and lateral canals that will channel diverted water to farmland in Saposoa. There is good reason to believe, however, that better planning of the project – including a realistic environmental assessment – would have led to a different design and lower capital costs. In particular, the reason for the dam is not immediately obvious. Flow in the river from which water will be diverted varies from 50.0 m^3/second late in the dry season to as much as 1000.0 m^3/second right after heavy storms during the wet season. In comparison, the diversion rate will be modest: approximately 1.3 m^3/second. If this flow could have been withdrawn at a simple river-side structure without a dam, as seems to be the case, then the dam is superfluous and the money spent constructing it was wasted.

A realistic environmental assessment undertaken soon after this project was originally proposed, in the middle 1980s, would have revealed that dry-season river flow exceeds the diversion rate by nearly two orders of magnitude and therefore no dam is needed. At the very least, such an assessment would have led to the avoidance of severe design flaws that caused the first dam, which cost approximately $1.00 million to construct, to collapse. Evidently, this structure was built without knowledge of peak flow during the rainy season and was washed away during a heavy storm. A larger, stronger dam was subsequently constructed for $2.00 million.

To the cost of the dam must be added construction expenditures on the primary canal, which will run 26.00 kilometers from the dam to the irrigated zone, as well as lateral ditches, which will take water from the primary canal to farm fields. Expenditures on the last 3.60 kilometers of the primary canal (which will be reinforced with concrete), the lateral channels, and other improvements will amount to $0.65 million. If building a kilometer of reinforced primary canal costs $200,000, then combined capital costs are:

dam expense + cost of first 22.40 km of primary canal + cost of final construction

= $2.00 million + [22.40 km x $200,000/km] + $0.65 million = $7.13 million

For the Saposoa project, financial analysis involves comparison of the net benefits of irrigation with capital costs and expenditures on canal operations and maintenance. A conservative estimate of annual expenditures of the latter kind would be 1 percent of the original construction cost: 0.01 x $5.13 million = $0.05 million. At a real interest rate of 10 percent, a recurring expense of this magnitude for 20 years has a present value of:

present value of O&M costs = $0.05 million x 9.7791 = $0.49 million

Obviously, a simple comparison of benefits and costs leads to the conclusion that the project is inefficient. Keep in mind, though, that $6.48 million – the expense of building the dam and the first 22.4 kilometers of the primary canal – comprise a sunk cost. In the case of this project, these past expenditures are literally water over the dam. At this point, the decision of whether to proceed involves comparing the net benefits of irrigation with remaining capital costs as well as the present value of maintenance expenditures. Subtracting the second and third values from the first value, one obtains a negative NPV of smaller magnitude:

NPV = $0.88 million - $0.65 million – 0.49 million = -$0.26 million

Since a precise estimate of operating and maintaining irrigation infrastructure is not available, sensitivity analysis is in order. In particular, NPV has been estimated for the scenario in which operations and maintenance costs 2 percent, not 1 percent, of canal construction expenses:

NPV = $0.88 million - $0.65 million - $0.98 million = -$0.75 million

In addition to recognizing that the discounted net benefits of finishing the Saposoa project – $0.88 million – are smaller than the capital cost of the last phase of the project added to the present value of maintenance expenditures, one needs to appreciate that actual materialization of these net benefits depends directly on institutions. In the past, irrigation development in Latin America, not to mention other parts of the World, was heavily subsidized. Furthermore, centralized agencies were responsible not only for financing and constructing infrastructure, but for operating and maintaining it as well. Under these circumstances, maintenance was routinely shortchanged. As a result, the benefits of irrigation often fell well short of expectations. Indeed, these benefits frequently ended up being less than the costs of delivering water to farmers (Southgate, Whitaker, and Ortiz, 1999).

During the 1990s, a number of Latin American countries, including Peru, began devolving responsibility for operating and maintaining irrigation systems to local associations of water users. In general, these associations have a better record than centralized agencies of managing infrastructure in advantageous ways. In various countries, empowered groups of farmers have levied higher tariffs on themselves, spent more on maintenance, and, consequently, earned more income from irrigated farming.

Assuming the sort of good maintenance that empowerment of local water users should enable, finishing the Saposoa irrigation project may be close to efficient in a financial sense. Whether or not it is efficient in a social sense depends on economic analysis, in which adverse environmental impacts are evaluated. Some of these impacts are direct. For example, anecdotal evidence suggests that fish migration has been interrupted in the river that was dammed. The value of food supplies resulting from this interruption would have to be subtracted from the NPV obtained from financial analysis. Another direct environmental cost to consider would relate to any land degradation caused by, say, poor drainage of irrigated parcels.

There are indirect environmental impacts to consider as well. In various settings, irrigation development has caused the demand for hired labor to increase. This has, in turn, drawn workers away from farms in surrounding hills, where deforestation is occurring in spite of erosion risks that diminish the returns from farming. Thus, agricultural encroachment in fragile environments has been reduced. Shively (2001) has documented this effect on a Philippine island. It could exist as well in eastern Peru. In a statistical analysis of the causes of deforestation in the Peruvian Amazon, Zwane (2002) has found that off-farm employment opportunities, which are limited in the region, are negatively linked to agricultural land clearing at the household level.

However, precisely the opposite dynamic may be at work in Saposoa. Roughly half of the 300 or so households that used to possess holdings in the 2,200 hectares to be irrigation have sold their land, at a profit reflecting some or all of the irrigation premium mentioned above. Presumably, many families have relocated to tree-covered areas, where they will proceed to convert forests into cropland and pasture. It is difficult to imagine that the environmental losses this will cause will be mitigated entirely by members of these families working as hired laborers on the irrigated farms of other people. Indeed, another of Zwane's (2002) findings suggests that indirect environmental impacts will be negative. In particular, she finds that transitory income – obtained from real estate sales, for example – is often used to finance agricultural land clearing.

To summarize, the Saposoa irrigation project as a whole is inefficient, even in a financial sense. The net benefits of supplying water year-round to 2,200 hectares of farmland are much smaller than total capital, operations, and maintenance expenses. But most capital expenditures fall in the category of sunk cost. Besides, realistic environmental assessment at an earlier date would have revealed the advisability of redesigning the project – leaving out the dam, to be specific. As of right now, expenditures required to finish building irrigation infrastructure and then operate and maintain it are slightly above a reasonable estimate of the net benefits of irrigation. If these net benefits actually materialize, as can be expected if local empowerment results in adequate maintenance, then finishing the project may make financial sense. Finally, the project has had and will continue to have direct and indirect environmental impacts. Assigning a monetary value to these impacts is not possible given available data and information. However, one supposes

that a sound economic analysis, in which environmental impacts would be valuated, would lead to the conclusion that finishing the project is socially inefficient.

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